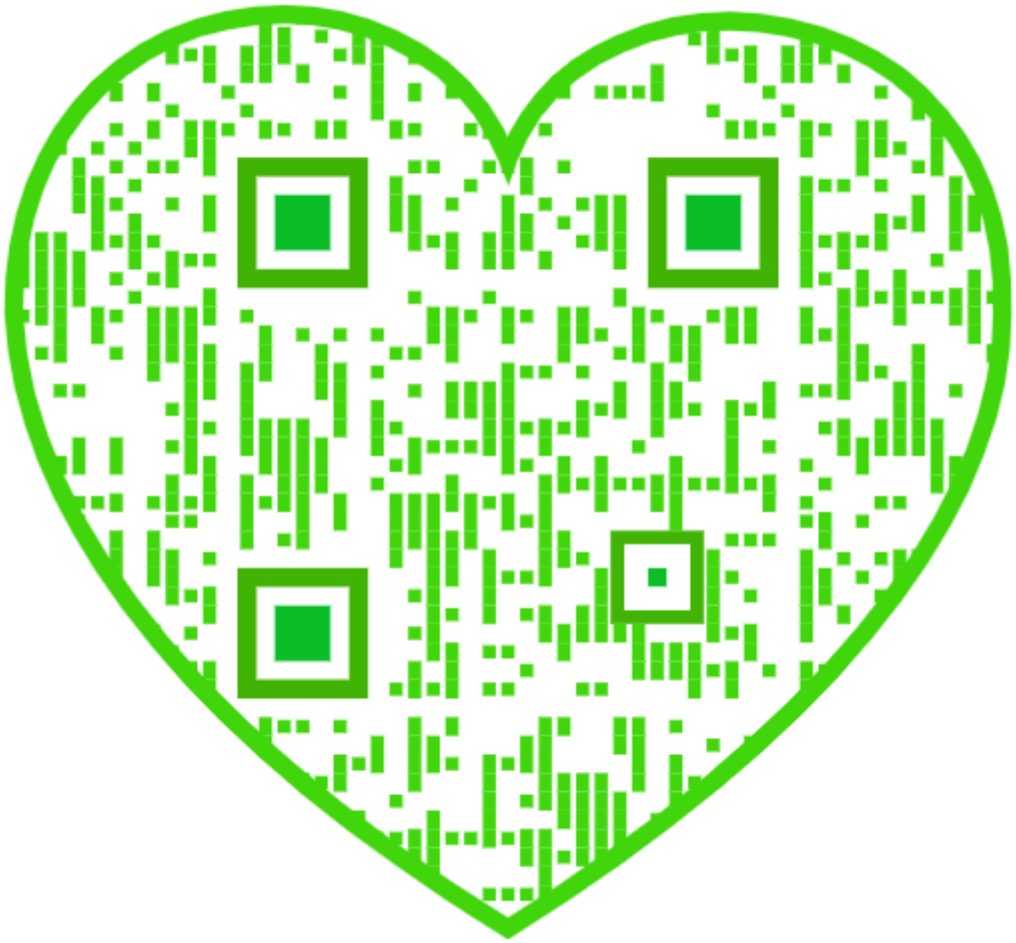
FIRST AID FOR BOYS

A MANUAL FOR BOY SCOUTS AND OTHERS INTERESTED IN PROMPT HELP FOR THE INJURED

COLE AND ERNST



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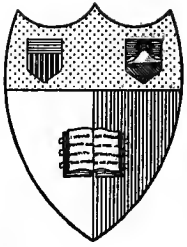

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FIRST AID FOR BOYS

FIRST AID FOR BOYS

A MANUAL FOR BOY SCOUTS AND FOR OTHERS INTERESTED IN PROMPT HELP FOR THE INJURED AND THE SICK

BY

NORMAN B. COLE, M.D.

AND

CLAYTON H. ERNST

DISTRICT SCOUT COMMISSIONER,
SECOND DISTRICT, BOSTON

WITH FIFTY-ONE DRAWINGS
BY WALT HARRIS

D. APPLETON AND COMPANY
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1917

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"Not only how but why"

PREFACE

We have written this book especially for boys, but that has not prevented us from trying to make it of service to everyone who is interested in doing the right thing for himself or for someone else in that tense moment when injury or sudden sickness brings confusion and pain.

In the first chapters we have considered the emergencies that are most dangerous to life, such as shock, bleeding, sunstroke, and heat exhaustion. The method of grouping them in two classes makes it easy for you to read symptoms and to tell without loss of precious moments what is the matter with the person who needs your aid and what you should do for his comfort and safety. From those most important emergencies the book goes on to consider accidents that through neglect may have serious consequences. Understanding of these depends to no small degree on thorough knowledge of more dangerous emergencies; therefore they find their logical place in the second part of the book. In the last chapters we consider the everyday accidents which often enough are painful, but which, though they need careful attention, are not sufficiently serious to touch life itself. There are, of necessity, a few inconsistencies in this general plan,

but the reader can, in every case, we believe, see the reason for our grouping.

It is a pleasant duty to express our thanks to the many physicians and Boy Scout officials to whom we are indebted for valuable criticisms and suggestions. Special appreciation belongs to Mr. Walt Harris for his great patience and care in making his drawings not only pleasing to the eye, but also accurate from the viewpoint of first-aid technique. We feel deeply grateful to Mr. James E. West, Chief Scout Executive, and to Mr. Franklin K. Mathiews, for advice and for generously given aid in developing the book. We are also much indebted to Major Robert U. Patterson of the American Red Cross, who in the midst of almost overwhelming duties has taken time to examine the manuscript carefully and to give us valuable suggestions.

N. B. C.
C. H. E.

INTRODUCTION

It gives me real pleasure to say a word with reference to the book by Dr. Norman B. Cole and Mr. Clayton H. Ernst. Perhaps I have had as large an opportunity as anyone in the country to appreciate the good that can be accomplished by making available in simple language, within the reach of the boy, the material included in this book entitled, "First Aid for Boys."

My interest in this publication has been increased since I have secured the report from the American Red Cross Society to the effect that it is sanely written from the standpoint of what should be said to boys and especially to young boys about the subjects covered.

The wisdom of the authors in not attempting to make this a complete treatise of the subjects covered increases the value of the book from the standpoint of the boy interested in making himself efficient in first aid work.

JAMES E. WEST,
Chief Scout Executive,
Boy Scouts of America.

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FIRST AID FOR BOYS

CHAPTER I

A HANDFUL OF SIGNS

One evening in May, 1915, three boys, on their way home after a fishing trip, were walking along a railway track outside a small Ohio town. Just beyond a crossing they came upon a dark shape lying beside the track. One of the three, a boy whose pockets were always filled with "odds and ends," pulled out an electric flash lamp and they saw by its bright shaft of light that a man was stretched limply on the embankment with his legs doubled under him in an unnatural position. His face was deathly pale, and he was bleeding slowly; now and then he seemed to fall into a doze, only to wake again and moan and turn his head from side to side. He had evidently been struck by the eight o'clock express.

The boys were not scouts and knew nothing of first aid. Terror-stricken, their first impulse was to run—run anywhere to get away from the awful sight. But something told them that they ought to

bring someone who knew what to do; and all three of them ran toward town as fast as they could, leaving the injured man alone. It was half a mile to the nearest house. By the time they had told their story, had routed out the country doctor and had guided the whole party back to the sufferer, he was dead.

The point is that these boys were not prepared for the emergency and did not give what comfort they might have given. It is possible that the man might have lived. As it was, he died of injury and loss of blood, and most of all from the shock that those things brought on.

What Would You Do?

Suppose you change this story a bit. Instead of 1915 make the date tomorrow; set the scene outside your own town and start off down the track with two other scouts. When you come to that poor man lying there, will you know what to do, or will your good turn go begging for lack of knowledge?

How will you check the bleeding?

Will you know that the man is in shock?

How will you know it?

What *is* shock?

Can you explain it to a tenderfoot so that he will understand it? Can you tell him just what treat-

ment to give the poor fellow at the crossing while the doctor is coming?

Stop reading right here, turn this book face down and think just what you would do in an emergency of that kind.

If you can answer those questions you may be able to save a life tomorrow, as this boy did:

THE BOSTON TRAVELER, TUES., FEB. 1, 1916

BOY SCOUT SAVES LIFE OF FATHER

MEDINA, N. Y., Feb. 1.—While fixing an arc light in the power house of the A. L. Swett Electrical Company, B. D. Timmerman of East Centre street was nearly shocked to death. His hand touched a wire which was grounded. The current jumped from the arc to his head and he received the full charge of 2400 volts.

Edwin, his 12-year-old son, who was with him, rendered first aid as taught him in the Boy Scouts, and then telephoned for help. Mr. Timmerman was revived.

If you can't answer those questions; if you can't remember how to stop bleeding or what the difference is between shock and apoplexy or between sunstroke and heat exhaustion; if you don't know whether to warm and stimulate a patient or to cool him and keep him quiet, you might just as well follow the example of those three boys in Ohio and run away the next time you see someone hurt.

It's like being at bat and not knowing whether to run to first base or to third. By the time you have sat down and studied the matter out in the rule book the coach will have released you forever and your nickname will be Duffer.

We believe there are many scouts and scoutmasters who find it hard to understand and to remember those things. Let's sit down and talk them over and see if we can make them plain to you.

Diagnosis

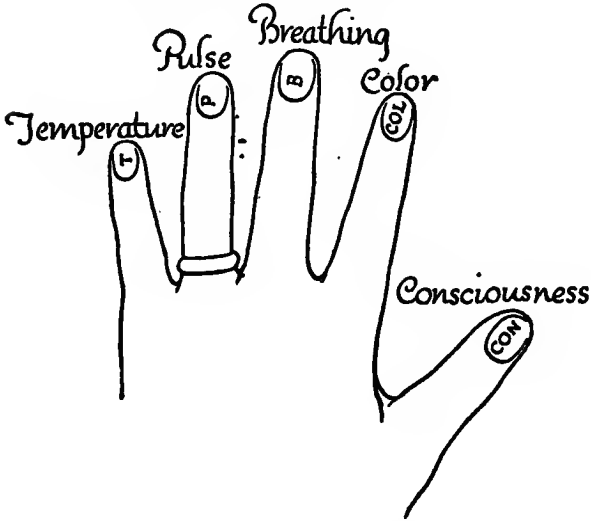
There are many injuries from which a patient will die very soon if the right thing is not done—shock, bleeding (hemorrhage), sunstroke and so on. They allow you no time for running to town to get the doctor.

How are you going to tell what the matter is? You cannot *see* sunstroke or heat exhaustion or shock as you can a cut or a broken bone. You must reason the thing out, and, furthermore, you must do it quickly.

There is a word that doctors use, "diagnosis." It is made up of the two Greek words "by means of" and "to know," and it means, as Webster's Dictionary says, "the act or science of recognizing the presence of disease by its signs or symptoms, and deciding as to its character."

Five Signs

Doctors have many signs for which they look—very many—and you cannot know them all; but there are five things that you can easily remember to look for and by means of which you can de-



cide what the trouble is. There is one thing for each finger on your hand—just a handful of signs.

Imagine that you have discovered by the side of the road a man who plainly is sick and yet is not bleeding and does not seem to have any wounds or

any broken bones. First, merely by looking at him, you notice whether or not he is conscious. As you read this, stick up your thumb and call it *consciousness.* Next, still only looking, you notice his *color;* connect that with your pointer finger. Then notice his *breathing*—middle finger.

That is all you can find out merely by looking. Now feel for his *pulse* and think of your ring finger. Last, for the little finger, investigate the patient's *temperature;* that is, find out whether his body is too hot or too cold.

There is your handful of signs by means of which you can discover or "diagnose" your sick man's condition. Dip a fine-pointed pen lightly in ink and write the signs on the finger nails of your left hand—thumb "Con" for consciousness; pointer finger "Col" for color; middle finger "B" for breathing; ring finger "P" for pulse; little finger "T" for temperature.

Before you can tell whether or not any of these signs indicate a bad condition, you must know what they are like in health. It's as if your small brother should ask you to correct his sum in addition. Suppose it is $3+7+2$. Before you can decide whether his answer is right or wrong you yourself must know that the correct answer is 12. So, for example, with the heart rate, which is counted by feeling of the pulse, as we shall show you presently; before

you decide that the rate is too fast or too slow you must know what the normal or usual rate is.

In Good Health

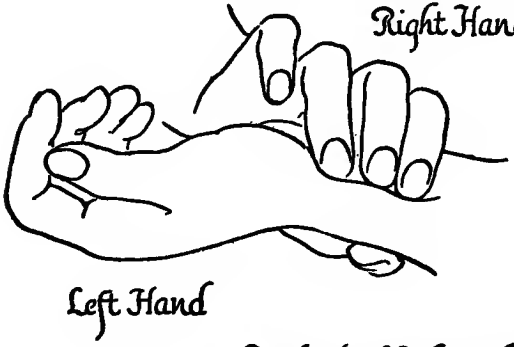
Take this handful of guideposts then, and let us see what they should show when a person is in good health. Ordinarily you expect a man to be fully *conscious* (thumb) all the time except when he is asleep. That is, he knows what is going on round him, can talk, move, hear, see, smell and feel.

The *color* (pointer finger) of his skin, as you know, is neither pale nor very red, but of a pinkish tint.

Some time when your father is reading his evening paper, get out your watch and see how many times a minute he *breathes* (middle finger). You will find that it is about fifteen or twenty and you will see that his chest rises and falls plainly, yet not very much.

Next take your own *pulse* (ring finger). Do you know how? Get a crowd of your friends together some time and ask them to take their own pulses. Watch them do it and you will have a good laugh, for no two of them will do it alike unless they have been taught how, and more than likely only one or two will do it right. Here's the right way: turn your left hand palm up; place the tips of

three fingers of your right hand on the thumb edge of your left arm just above the wrist and move them about until you feel the pulse with all three tips. Never use the thumb in feeling for the pulse. It has a fairly large artery in it and when you put it against anything you feel the pulse in your own



Method of Taking Pulse with Three Fingers

thumb. By using your thumb you can often get a perfectly good pulse out of an iron lamp post.

Count the pulse in your own wrist and in several of your friends' wrists. You will find that unless you have been exercising, the rate is about seventy to eighty a minute. It is commonly said to be seventy-two.

As to *temperature* (little finger), you need not

know very much. You may never have one of the delicate little thermometers that doctors use, but you can usually tell by feeling of a person's skin whether he is colder or warmer than he ought to be. Of course, if he has been in a very hot or a very cold place his skin for some time will be too hot or too cold; but you will make allowances for that. The doctor's thermometer, held three minutes under the tongue with the lips shut but not the teeth, would show you that the normal or usual temperature is very close to 98.6° Fahrenheit.

Now you have a handful of good or normal conditions. Consciousness—present; color—pinkish; respiration—moderately deep and fifteen or twenty to the minute; pulse—seventy to eighty beats to the minute; temperature of the body—98.6° Fahrenheit.

DIAGRAM 1

The signs	Normal
1 Consciousness ..	Present
2 Color	Pink
3 Respiration ..... (breathing)	Quiet; about 15 to the minute
4 Pulse	70-80 to the minute. Varies with persons
5 Temperature ...	98.6° Fahrenheit

In Bad Health

There are two general kinds of conditions when the normal signs are changed. In one—and this was the condition of the man injured at the crossing—the whole body, with all its activities, seems to be depressed. The person is dazed or sleepy, but seldom unconscious; his color is pale, for the circulation is weak and the blood either has been lost or has retreated to the big vessels in the interior of the body, leaving the surface bloodless and white. His breathing is shallow, that is, he takes only a little air into his lungs at a breath, consequently his chest moves up and down but little—perhaps so little that it looks as if he were not breathing at all—and because he takes in so little air at a breath he must breathe oftener. That is why the respiration rate goes up from fifteen to twenty-five or so.

The pulse rate and the respiration rate are like two scouts on their fourteen-mile hike—they keep together. If the respiration increases in rate, so does the pulse; when one is slow, the other is also slow. So here we expect to find the pulse rapid, and we do. It rises to ninety or a hundred or a hundred and twenty, and you find that the pulse beat at the wrist is weak. You see the heart is really a pump, and a very successful one. If, when you blow up the tires of your bicycle, you force the

pump handle down to the limit each time, you need take only a few strokes before the tires are hard. But if you push the handle down only half way each time it will take twice as many strokes to get the same amount of air into the tires. Just so with the heart. If it is weak it must beat oftener than usual to get the same amount of blood round to the brain and the other organs; and so a weak heart beats faster than a strong one.

Last, the temperature is low—just as there is less heat in the stove when the fire burns low. When the vital functions of the body are not working "up to scratch" less heat is produced and the body is actually less warm. The variation can be only very slight, however, for the body is so delicately built that a change of only two or three degrees up or down from the normal makes you feel very sick. If your temperature should drop at this moment to 95° or 94° all the blankets in the world would not keep you warm and you would soon actually die of cold. When the skin is pale, the breathing shallow and rapid and the pulse rapid and weak, the temperature is always lower than normal.

This weakened, depressed state of these vital functions is found in such conditions as fainting, shock from any cause, severe bleeding and exhaustion of all kinds, including heat exhaustion. These together we shall call group A.

DIAGRAM 2

The signs	Group A—Depressed Conditions: Shock, Fainting, Heat Exhaustion, Hemorrhage
1 Consciousness ..	Present, but often dulled. In Fainting, absent for a short period
2 Color	Pale
3 Respiration ..... (breathing)	Shallow: perhaps somewhat rapid, 16-25 to the minute
4 Pulse	Weak, "thready," rapid; 80-130 to the minute
5 Temperature ...	Low: 96°-98.6°; skin cool, with clammy sweat

Suppose now that some time you find a sick man with opposite signs. For example, he is wholly unconscious; that is, you cannot wake him up by touching him or by speaking loudly to him or by shaking him gently; his face and skin are red, sometimes even purple; his respiration is slow, deep and noisy, as if he were snoring very busily; his pulse rate, as you expect when the respiration is slow, is also slow and the pulse full and strong at the wrist; and lastly, his skin feels warm. You would know at once that the trouble was different; that this man was sick in a different way from the first patient, and that probably the first aid treatment would be

different too. You would be right. It is easy to imagine a case in which the wrong treatment would mean the death of the patient and the right treatment a quick return to better health.

Doctors call his slow, full pulse the "head" pulse because it means that the brain has been affected in some way. So this second group of changed or abnormal signs points to what we may call the "head injuries." They are such conditions as concussion, epilepsy, apoplexy, skull fracture, alcoholic intoxication and sunstroke, and they make up group B.

DIAGRAM 3

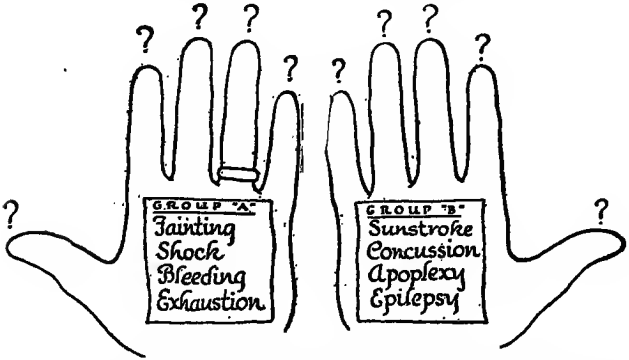
The signs	Group B—Head Injuries: Concussion, Skull Fracture, Apoplexy, Epilepsy, Alcoholic Intoxication, Sunstroke
1 Consciousness ..	Dulled; often absent for hours
2 Color	Flushed
3 Respiration ..... (breathing)	Deep, noisy; perhaps somewhat slow, 13-16 to the minute
4 Pulse	Full, bounding, slow, 50-80 to the minute
5 Temperature ...	High; 98.6°-113° (Sunstroke); skin hot; either sweaty or dry (Sunstroke)

We are putting a good deal of emphasis on these changes in the five signs because if you will remem-

ber these things you will find it easy to decide, in a general way, what is the matter with any sick person you may come across; once you know that, you know also what to do for him. And that may mean the saving of someone's life—surely the finest thing a scout can do.

To Make You Remember

If you can't remember these changes easily, try this way: let your left hand represent the de-



pressed conditions, or group A; on the nails write the signs. Take your fine-pointed pen again and on the thumb nail, which represents consciousness, write "dull"; on the pointer nail, which stands for color, write "pale"; middle nail, "rapid, shallow"; ring nail, "rapid, weak"; little nail, "low." Then on

your palm stick a gummed label with the conditions in which these signs are found—namely, fainting, shock, bleeding (hemorrhage), exhaustion. On the other hand put the head injuries and their signs. If you find it hard to write with your left hand swap good turns with some other scout: write on his finger nails and then have him write on yours.

Now hold up your hands in front of you, palms down, read the signs from your finger nails, and see if you can tell in what conditions these signs are found. Or hold your hands palms up, read the conditions from the label, and try to tell what signs you will find in them. Work it with the other scout and make a game of it, counting one for every correct answer and taking off one for every mistake. The game is ten.

Now let's roll figures 1, 2 and 3 into one and look at this whole chapter all together. Do not read the later chapters till you feel that you have learned these things perfectly, for they make the way very easy when we come to the separate subjects. Don't be guilty of putting the cart in front of the horse. Diagnosis comes before treatment all the way through the study of medicine. It is plain that before we attempt to treat a patient we must first know how to go about finding out what the trouble is with him.

DIAGRAM 4

The Signs.....	Normal	GROUP A Depressed Conditions: Shock, Fainting, Heat Exhaustion, Hemorrhage	GROUP B Head Injuries: Concussion, Skull Fracture, Apoplexy, Epilepsy, Alcoholic Intoxication, Sunstroke
1 Consciousness.	Present	Present, but often dulled. In Fainting, absent for a short period	Dulled, often absent for hours
2 Color	Pink	Pale	Flushed
3 Respiration .. (breathing)	Quiet; about 16 to the minute	*Shallow;* perhaps somewhat rapid, 16-25 to the minute	*Deep, noisy;* perhaps somewhat slow, 13-16 to the minute
4 Pulse	70-80 to the minute. Varies with persons	*Weak, thready,* rapid; 80-130 to the minute	*Full, bounding,* slow; 50-80 to the minute
5 Temperature .	98.6° Fahrenheit	Low; 96°-98.6°; skin cool, with clammy sweat	High; 98.6°-113° (Sunstroke); skin hot, either sweaty or dry (Sunstroke)

CHAPTER II

WHAT TO DO

THIS is going to be a very short chapter, but it's just as important as it is short. It will tell you something in a general way about first aid treatment of sick people—the principles that hold good in all kinds of emergencies.

You Find a Sick Man

Suppose you find a man on the road whose signs fall into group A—he is drowsy, pale, and cold, with weak, rapid respiration and pulse. Because he is cold you must warm him; and you must get him wider awake and make his heart and breathing apparatus work harder if you can. Is that plain? It must be, for it is common sense.

The simplest way of warming him is to wrap him in warm clothes—blankets if you can get them. In cold weather see that they are warmed by being held in front of a fire before you put them on the patient. Lacking blankets, any clothes will do. Be sure to put them under him as well as on top of him,

for the ground is always colder than the body. If he is conscious and can swallow, you can warm him *inside* by giving him something hot to drink; it doesn't make much difference what it is, so long as it is really hot.

Sometimes nothing except this warmth is necessary to make a man feel much more comfortable. But it is always a good idea to give him a stimulant too—some drug to make his heart beat stronger and to make him breathe more deeply.

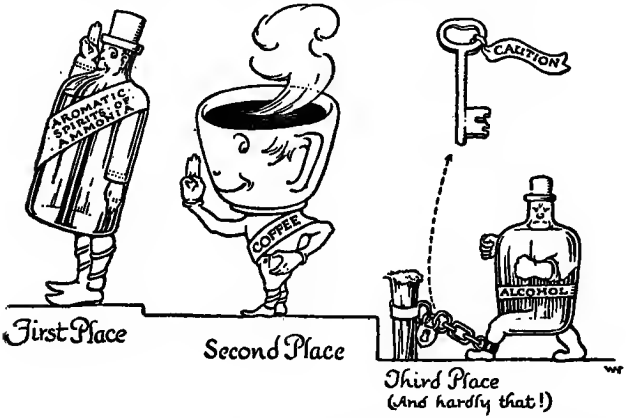
Stimulants

The best stimulant is aromatic spirits of ammonia. Say that big name over to yourself till you can remember it (better than a boy who asked the druggist for "automatic spirits"). The dose is half a teaspoonful (thirty drops) in half a glass of water, and it may be repeated once after fifteen minutes. This is by far the best stimulant and should be in every first aid kit.

The next best stimulant is hot black coffee, which contains the drug caffeine. This is more common than the aromatic spirits of ammonia and has the advantage of being a warming agent as well as a stimulant. Each cup of strong coffee contains about two grains of caffeine, which is the usual amount that the doctors give to sick people with bad hearts; so you see what a powerful drug it is.

That is the reason why any coffee is bad for growing persons and why grown people should use only a little of it.

The third drug used as a stimulant, and a very poor one too, is alcohol. It is really no stimulant at all, but gives some of the same effects. It makes



the sick man feel better for a little while because it burns his throat as it goes down and after a while it makes his skin feel warm; but its effect is brief and is always followed by some degree of depression. It is usually given in the form of brandy or whisky, both of which are about half alcohol. If you cannot get either of the other stimulants, use one to three teaspoonfuls of alcoholic drink and *do not repeat it.*

You Find Another Sick Man

Suppose you find another man; this time the signs fall into group B—the head injuries. He is unconscious, very red, with a warm skin, breathes deeply, slowly, and noisily, and has a slow, full pulse. Here again you can reason out the treatment easily. It would be foolish to think of giving him a stimulant; he is unconscious and cannot swallow; the fluid would probably run down his windpipe and choke him. Instead of helping the poor man you would drown him. Since his body is already too warm, you will not try to warm him more, but will get him into a comfortably cool place, out of the sunshine, and perhaps bathe his face and hands with cool water. Above all other things, keep him quiet. Get him as far away from noise and bright light as you can.

To sum up: the general treatment for group A is warmth inside and out and stimulation; for group B, a cool place and perfect quiet.

Always Remember This

Before we end this chapter we want to say one thing to you, friend scout, that you must never forget. It is this: remember that your duty to your patient is only half done when you have finished your first aid treatment. The second aid and all

the rest of the treatment must come from a real doctor, who knows what he is about. Make your man comfortable, overcome the emergency, then do not rest till he is in the hands of a physician; for the man with the M. D. after his name knows far more about doctoring than any first aid book ever written can teach.

CHAPTER III

SHOCK AND FAINTING

MOTHER NATURE is a wise, kindly old soul, who has planned things very wonderfully for us. If we are too warm, she makes us sweat and grow cooler. If we are too cold, she teaches us to generate new heat by shivering. If we put our finger by mistake into the fire or into boiling water she orders certain nerves to tell us of it in about one-tenth of a second; and we usually know enough to pull the finger out of harm's way.

But in spite of Mother Nature's care accidents will happen; we fall and break our bones, or get badly burned, or lose much blood from a cut.

What does she do for us then, when the pain is so great that it seems impossible for us to bear it another moment? She can't make that broken bone whole again in a minute, or replace the skin that the fire has burned away, or manufacture a pint of new blood on the spot.

Says she, "What can't be cured must be en-

dured," and sets out to help us bear the pain. She can't immediately heal the wound, and she can't

do much with the nerve that is carrying the sensation of pain to the brain; but the brain itself —why—she believes she *can* fix that so that it won't feel the pain so keenly, perhaps not at all. And

she goes to work and does succeed more or less in dulling the brain.

That explains why you sometimes see persons who, though badly hurt, do not seem to feel much pain. They lie quietly, do not move much and pay little attention to what goes on about them. Perhaps they don't even answer when you speak to them; but when you repeat the question several times they answer slowly and weakly, but correctly. They are not unconscious, only dull.

SHOCK

That arrangement of Mother Nature's is a great comfort to the injured man. The only trouble is that the brain is the master of the body and when it becomes dull (the doctors call it "depressed") and "lies down on the job," the other organs of the body also will shirk their work. Some of these other organs, the heart for example, are needed just as much as the brain is to keep the body alive. You can see how, when the brain is more and more depressed and the other vital organs along with it, that all the processes which keep the body alive are more and more hindered and weakened. *The body is like a great machine* slowing down; it goes slower and slow-er and s-l-o-w-e-r—and stops. When a man does that we call it dying.

Often, when a man is badly injured, Nature tries

so hard to keep him from suffering pain that she depresses his brain too much, and, like the machine, the man stops. When this happens after an injury you cannot say that the man died from the injury directly. He really died from the depressed condition of brain and vital organs brought on by the accident.

This drowsy, depressed, half dead condition is shock, sometimes called surgical shock. It may be so slight that we say the patient is only "shaken up." Or it may be more serious and make him drowsy and dull and pale and cold. And then it may easily be serious enough to cause death.

A few illustrations will make shock plainer to you.

Slight Injury

Mrs. Hall, a farmer's wife, started "crosslots" to take a pan of hot biscuits to a sick neighbor. On the way the path led down a steep slope. Here Mrs. Hall tripped, fell heavily and rolled some little distance. When she got up her right wrist pained terribly and she felt "all shaken up." She managed to reach the neighbor's house but was glad to get into a chair. You would have said that she was exhausted. She sat there with her head resting on the back of the chair and her eyes closed; she was sweating profusely and her skin was pale

and cold, yet she did not faint. They put her wrist on a pillow and gave her hot peppermint water. After a while she felt better and could be taken to the doctor to have her wrist treated.

The pain of the broken wrist and the jouncing as she rolled down the hill had caused a mild degree of shock; the rest and the hot drink were enough to overcome the condition of shock and make Mrs. Hall feel better.

Severe Injury and Fright

One night, on a western railway, a great boulder rolled down the mountain side, struck a heavy Pullman car, knocked it off the track, rolled it over and broke it open. Fortunately, no one was seriously hurt except one middle aged man, who seemed at first to be dead. He lay sprawled on the ground; he was pale, and did not seem to be breathing or to be conscious. A doctor looked him over carefully and found that he had a broken leg and a cut on the cheek; neither injury however seemed very serious. The doctor spoke loudly to him and touching him on the shoulder shook him a little. The man opened his eyes slowly, whispered something, and shut his eyes again. He was not dead then, but in severe shock. Notice that you do not say "in a shock" or "that a person is shocked." You always say that he is "in (the condition of) shock."

This man might have died if the doctor had not immediately treated him for shock—even before he attended to his broken leg. With the proper treatment (which we shall presently describe) he was soon out of danger and able to have his broken leg set and his cheek dressed. The rule is: always treat shock first except when the person is bleeding severely; in that case your immediate duty is to stop the hemorrhage.

Strong Emotion

A boy ran away to sea from his home in one of the English south shore villages, leaving his old widowed mother alone. For years she waited for him to come back or to send word. No word ever came. Every morning, because of the great love and the great grief in her heart, she prayed for the boy, and every night, because of her hope that he might not be dead and might some day come back, she set a light in the window for him. With worry and grief and hard work she grew old and thin and wrinkled. This went on for nine years. Then one afternoon the door opened suddenly and on the threshold stood her sailor boy. She rose from her chair, speechless with joy, tottered a few steps toward him and suddenly dropped dead on the floor. Shock, and nothing else, had killed her.

A Bird's Eye View of Shock

Now with those three examples in mind let's put all we know of shock together in a few words.

Cause

You never saw a caboose start off by itself and go racing along the track all alone. It must have an engine ahead of it. Shock is like a caboose. It never gets started by itself; there is always something ahead of it. That something may be a sud-

den, severe injury or a strong emotion. In the first example above shock was due almost entirely to the injury; in the second, to injury plus the fright of being in a train wreck at night; in the third, to nothing except pure joy. The commonest causes of shock are burns, bad fractures, all sorts of sudden accidents, fear and joy.

Reading the Signs (Diagnosis)

We have spoken of shock as a depressed condition. That puts it at once in group A (see Chapter

I), and if you will count over your fingers you will remember what signs you find in that group. The patient is mentally drowsy, but when roused answers questions clearly but weakly and shuts his eyes again as if he were not strong enough to hold them open; he is pale; he breathes rapidly—20 to 30 times a minute, and very shallow, so that you may have to look closely to see that he is breathing at all; his pulse is weak and rapid, 100 to 130 a minute; his temperature is low and very likely he is shivering, even though the day is warm; his skin is cold and probably covered with a cold sweat. Beside all this, if you can see that the man has been injured or know that he has had a great fright or a great joy, you may be pretty sure that your patient is in shock and you should treat him for shock at once.

Treatment

Look back to Chapter II now and brush up on the treatment of group A. Get your patient flat, with no pillow under his head; loosen tight clothes, warm him and give him a good stimulant—aromatic spirits of ammonia or strong hot coffee. Here coffee is better, since both its heat and its caffeine are stimulants. Sometimes rubbing the arms and legs gently toward the body will help the circulation; but do not uncover them to do it. Keep him quiet,

give him air and get the doctor. If there is great bleeding you must treat that first, of course, but in all other cases attend to shock first.

Warning

Now a word of warning. You have probably heard of old people who "have had a shock" and are paralyzed. That is the common way of saying that they have suffered from apoplexy. When you read about apoplexy in Chapter VI turn back and read this chapter over again and see how different apoplexy and surgical shock are, and you will never get the two mixed. Don't confuse surgical shock with electric "shock," either. The passage of electricity through the body, if the current is strong but not strong enough to kill the man at once, will bring on surgical shock; but there again the electricity is the engine after which, like the caboose, comes shock.

FAINTING

Cause

There are many causes of fainting. Perhaps you have read in the paper that when the parachute failed to open, or when the lion sprang at his trainer, women in the audience shrieked and fainted. A hot, close room, hunger, pain, the sight of blood,

a sudden clap of thunder, an accident that you see happening to others, a bad smell, being sick at your stomach—all those things and many more are causes of fainting.

Fainting is like shock because it belongs in group A and the patient is cold and pale, often with a cold sweat. It is unlike shock because it does not necessarily follow an injury or intense emotion; the pulse and breathing are little affected, and the patient is completely unconscious, although not for long.

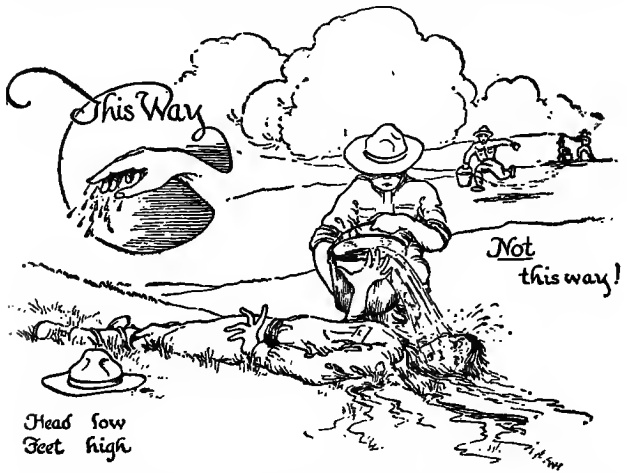
Reading the Signs

The diagnosis is easy. The patient suddenly becomes pale; falls, if he is standing, or slumps down in his chair, and is completely unconscious. He cannnot be roused until he "comes to"; that may be in half a minute or in several minutes. When he does "come to" he is almost at once as well again as he was before he fainted.

Treatment

What happens in fainting is that the big blood vessels in the interior of the body dilate suddenly; into them rushes the blood, leaving the brain with so little that it cannot keep working—the power is cut off from the dynamo. For the same reason the face is pale. The reasonable thing to do is to

turn the patient upside down and let the blood run back to the head. Do this by laying him down, with his head *low* and his feet *high;* loosen tight clothing, sprinkle cold water on the face and chest (don't pour it on the patient out of a bucket, but dip your hand in the water and flip it in his face),



and when he becomes conscious give him a stimulant. Sometimes the smell of ammonia alone is enough to "bring him to" (smelling salts, you know, are mostly our good friend aromatic spirits of ammonia). If the patient is a woman get another woman to loosen her clothes.

Sometimes a light slap on the cheek or the palm will stimulate the patient. (We all can remember

being very much stimulated by certain slaps with a slipper which did not injure us in the least.)

If the patient recovers quickly and you are *sure* everything is all right you may not need to call a doctor. Once in a while an attack like this may not be due to simple fainting but to heart failure. If you are not sure of yourself always get a doctor.

SUMMARY

Shock

1 Cause: Sudden or severe injury, strong emotion.

2 Diagnosis: Belongs in group A. Patient dull, pale and cold, with rapid, weak respiration and pulse, and often a cold sweat. Patient may shiver, even on a hot day.

3 Treatment: Warm and stimulate the patient in quiet, warm place. No matter what the injury, except bleeding, treat shock *first.*

Fainting

1 Cause: Many causes: bad air, sick stomach, sickening sights or smells, fright, etc.

2 Diagnosis: Belongs in group A. Unconsciousness sudden and complete, patient very pale, cold sweat, pulse and breathing may be unchanged.

3 Treatment: Lower head, loosen clothing, stimulate when conscious.

CHAPTER IV

A LITTLE ABOUT THE BLOOD AND MORE ABOUT BLEEDING

If your scoutmaster should ask what the heart is for, every one of you would think it about the easiest question he could ask. You would probably get 100 per cent. on the answer. With a smile you would say, "It pumps the blood round the body." Why, you have known that ever since you knew you had a heart! It seems queer to think of *anyone* not knowing it.

But Shakespeare and Columbus didn't know it. And when the Pilgrims landed at Plymouth in 1620 they thought, as everyone else did then, that the arteries were air pipes (that's what the word "arteries" means) connected with the lungs, and that the blood existed in the veins alone and moved only a little, sometimes in one direction and sometimes in the other, never making a circuit. And they thought that the heart was full of some strange sort of life-giving substance different from blood.

Then in 1628 a man named William Harvey, who was physician to the King of England, wrote

a big book in Latin and said that he had discovered that the heart was really full of blood, which it pumped out through the arteries and which came back to it through the veins.

That caused a great rumpus, and many wise men said that they had never heard of such a crazy idea. But Harvey stuck to it and found others who believed that he was right.

The upshot of it was that after long letters had been written, all in solemn Latin, and when the old doctor was safely in his grave with his wig on, everybody came round to Harvey's ideas about the circulation of the blood.

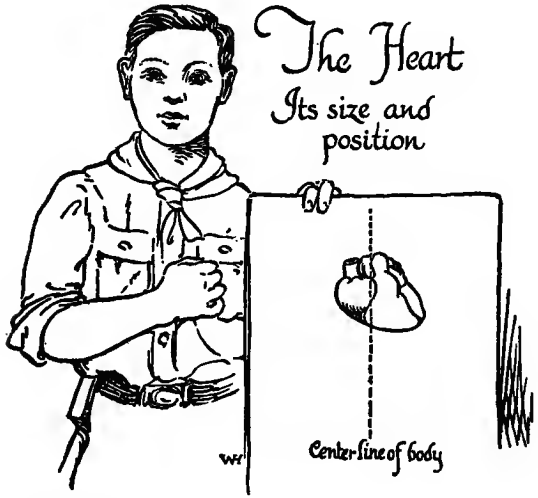
Not long after that someone put several magnifying glasses together and made the first microscope, with which men could actually *see* the blood running through the veins and arteries.

And now no one doubts the circulation of the blood for a minute, although the knowledge of it is no older than the old houses in Plymouth and Salem.

The Heart

To make any circulation possible there must be pipes for the liquid and something to make it move through them. In the body the blood vessels are the pipes, the blood is the liquid and the heart is the pump.

The heart is a pear shaped organ as big as your fist. It is made entirely of muscle, but is different from other muscles because it is hollow and is divided into a right and a left side. The right side receives the blood that has just been round the body



and that has given up its oxygen and pumps it through a special short circuit to the lungs, where it takes up all the oxygen that it needs from the air we have breathed in. Thus "stocked up" with oxygen the blood returns to the *left* side, from which it is pumped out to begin a new journey round the body.

Arteries, Capillaries and Veins

The arteries, capillaries and veins are the pipes through which the blood flows. The pipe that leads the blood away from the heart is a big artery. It soon branches into a number of smaller arteries and these into smaller and smaller ones, which reach here and there into every corner of the body, even into the bones and the teeth. Finally, the tiniest branches are so small that you cannot see them except with a big microscope. There are millions of these and they are very short and fine, so that their name "capillaries," which means "like hairs," fits them nicely.

While the blood is passing through these tiny capillaries it gives off to the body the oxygen that it carries. They are like the radiators in your house. The furnace, which is the heart, starts the hot water circulating; it runs through pipes which branch several times to reach different parts of the house, growing smaller each time they branch. By and by the hot water comes to a radiator made of small short pipes. Here it gives off its heat to the house, just as the blood gives off its oxygen to the body in the capillaries. From there the cooled water runs back to the furnace to get a new supply of heat just as the blood runs back to the heart and lungs for more oxygen.

So, after it has passed through the short capillaries, its main business is to get back to the heart as fast as it can. The capillaries begin to join now instead of branching, and so form the smallest veins. These tiny veins join each other, always getting larger; more and more of them run together, like brooks running into a river, until by and by there is only one big vein, which empties into the right side of the heart.

When the heart is filled with blood from the veins, it suddenly contracts and squeezes the blood out. Small, strong valves keep the blood from going back into the veins so that it always leaves the heart through the arteries. As you know from Chapter I, the heart contracts or "beats" about seventy-two times every minute. The result of the squeezing action is that the blood in the arteries moves ahead in spurts or waves which you call pulse beats when you feel for them in your friend's wrist—much as water spurts from a hollow rubber ball when you squeeze it.

Therefore, when an artery is cut the blood escapes in jumps or spurts. Remember that.

But by and by, when the blood reaches the capillaries, the pulse beat gets lost. Perhaps the capillaries are so small that, though the blood gets through, the pulse beat is strained out.

Suppose you imagine a thousand scouts going

to a World's Series baseball game. They march down the street in fine, swinging step; that represents the pulse beat. Coming to the field they have to go through a number of narrow gates that will allow only one scout to pass at a time. Here they lose their step, just as in the capillaries the blood flow loses its beat. On the other side of the gates,

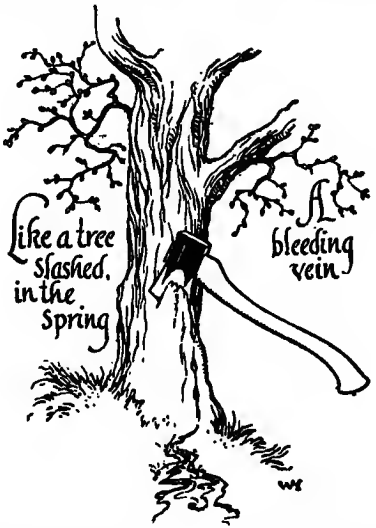
they hurry along toward the bleachers all mixed up and out of step. Just so the blood on the farther side of the capillaries flows steadily back toward the heart without a pulse beat.

Therefore when a vein is cut the blood escapes in a steady stream without spurting. Remember that too.

The Blood

This blood which we have been talking about is a very busy sort of a substance. Because it can

move about it is forced to do all the body's errands. It picks up the food that we digest, carries it to the organs that store it up and to the muscles that use it; takes up oxygen in the lungs and carries it to the organs that need it; brings back from them the waste products, some of which it takes to the



lungs to throw off, some to the sweat glands, some to the kidneys. Those are only a few of the many things the blood does for us. You see, it is a sort of messenger boy for the whole body.

The blood contains an enormous number of tiny little round things called corpuscles. Most of them

are red and give the red color to the blood. These red corpuscles carry the oxygen, and here is a curious thing: the more oxygen they carry the brighter red they are; so that when they have been loaded with it in the lungs and pass through the arteries the color they give the blood is bright red. When they have reached the capillaries and have given up most of their oxygen and taken up carbonic acid gas (which darkens the color) they give a dark red or purple color to the blood.

Therefore blood from an artery is always bright red and, as we know, escapes in spurts; while blood from a vein is dark red or purple and flows out in a steady stream.

There are so many of these little red corpuscles that a cubic inch of blood—a good tablespoonful—holds more than fifty times as many of them as there are people on the earth. Since our very life depends on these tiny red corpuscles and the oxygen they carry, perhaps you can begin to understand what a wonderful substance blood is and how important it is not to lose much of it.

Hemorrhage

When a blood vessel is cut, hemorrhage occurs; that is, the blood escapes. Hemorrhage and bleeding mean the same thing. The word hemorrhage comes from two Greek words meaning "blood" and

"to burst or break out," so that we may define it as loss of blood from any blood vessel.

When you draw a drop of blood with a pinprick you have caused a hemorrhage; but one so tiny that you don't worry about it, because you know that Nature will soon stop the bleeding. She does it in a wonderful way, like the magician she is. As soon as blood is exposed to air it begins to change into a jelly-like mass that grows harder

and harder with time. We call the process clotting. You know that after you cut yourself a clot of blood forms in the cut and grows harder; by and by it is what we call a scab; finally it falls off and we see that the cut underneath is healed.

The clot that forms when a small artery is cut acts like a stopper and keeps more blood from escaping; but in a bigger artery the force of the pulse beat is so much stronger that it pushes the stopper away with each beat.

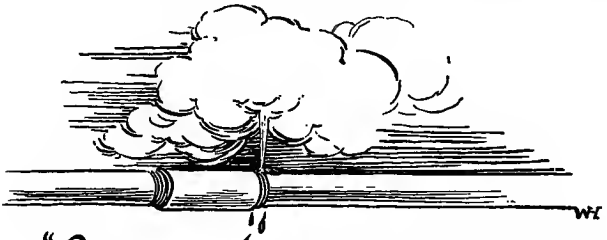
That does not happen in the veins because there is no pulse beat and the blood flows more slowly; so,

of course, when a vein is cut the clot has a better chance to form and stop the hemorrhage.

Therefore bleeding from an artery is much more dangerous than from a vein.

Why Is Hemorrhage Dangerous?

Suppose in an engine room a steam pipe bursts and steam escapes. A small leak is not serious, but suppose a great deal escapes. What will happen to the engine? Why, since it cannot go without steam it will slow down, and if enough steam is



"Suppose a great deal escapes"

lost it will stop. It cannot run without steam. Neither can the body keep going without blood. With the blood supply partly lost the body must slow down like the engine. Once before (in Chapter III) we spoke of the body in this way and called the condition shock.

A severe hemorrhage, then, will bring on shock,

which we know from Chapter III is a dangerous condition. If still more blood is lost the person becomes totally unconscious, because there is not enough blood in the body to keep the brain awake; and finally, if the leakage is not stopped, the person dies.

But the hemorrhage doesn't need to be severe to cause shock. You remember that shock may be caused by great emotion, especially fear. It is dreadful enough to see others bleeding badly; but it is far more dreadful to see your own blood spurting away. Some people are thrown into serious shock by seeing their own wound even when the hemorrhage is not severe. People have been known to develop shock from a mere pin prick which draws but three or four drops of blood.

Therefore always watch for shock after any hemorrhage.

What to Do

A bad hemorrhage is like the ninth inning of a baseball game when the score is one against you and there are two out, two strikes on the batter and a man is dancing up and down on third. The right thing must be done and done in a hurry, or the game is up!

You must stop the bleeding. How you shall do it depends on whether it is from an artery or from

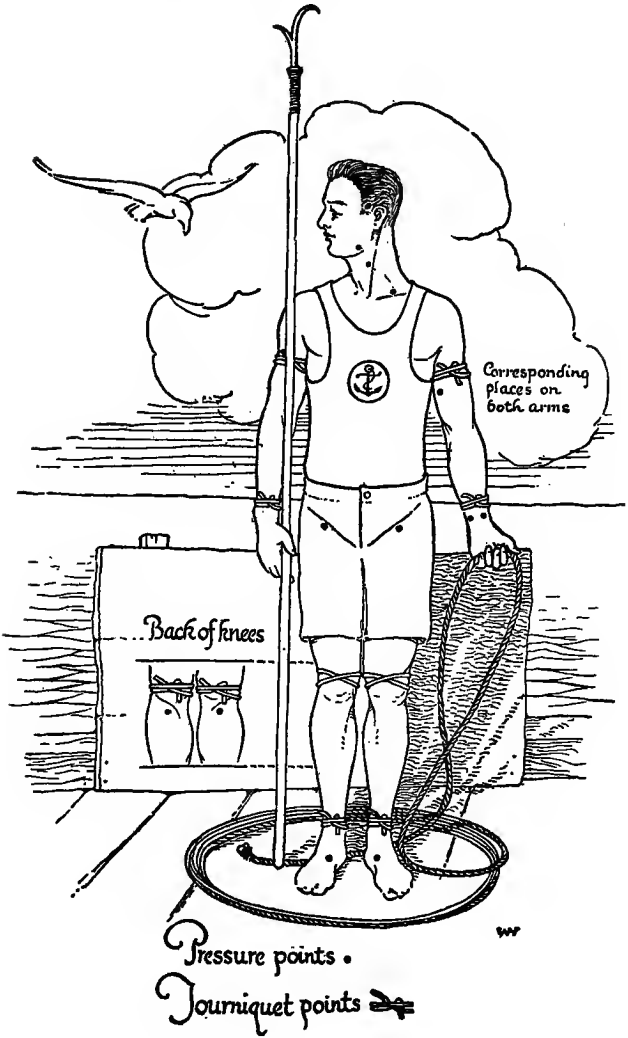
a vein; you already know how to tell which it is, and you know that hemorrhage from a vein is easier to stop and less dangerous.

In the case of a vein a piece of sterile compress (see Chapter VII) put over the bleeding point and bound on tightly with a bandage will often stop the hemorrhage. If not, a tourniquet surely will. Since in the veins the blood is flowing *toward* the heart, put the tourniquet on the side of the cut *away* from the heart. Fortunately, most bleeding that you will see will be from the veins because they lie near the surface of the body; and you will seldom need the tourniquet.

On the other hand, when you have a fair-sized spurting artery to treat no amount of pressure over the wound will stop the hemorrhage. You must shut the blood off by pinching the artery before it gets to the wound—that is, between the wound and the heart.

The principal arteries, unlike the veins, are usually deep in the flesh, near the bones, and covered thickly with muscles. Here and there they come nearer the surface; these are the places where you must pinch them.

The easiest and quickest way of pinching an artery is to press hard on it with the fingers or thumb; but these soon get tired and have to be relieved by a tourniquet. The need for a tourniquet


Corresponding places on both arms
Back of knees
Pressure points •
Tourniquet points

will probably come without warning as it did to two scouts in the Ossipee Mountains. You must be prepared to use your wits, and to use them without loss of time.

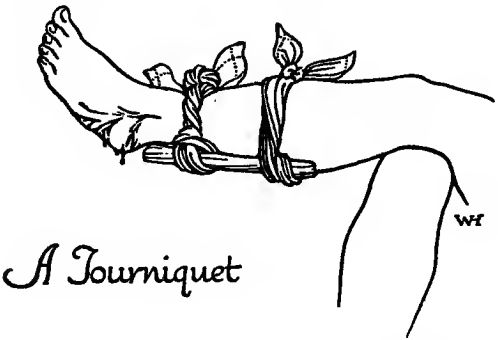
Morton Drysdale and Tom Edmands were building a log cabin on the side of Black Snout Mountain. Morton was cutting out the grooves in the ends of the logs when his ax slipped and caught him on the inside of his leg a little above the ankle. The sharp blade went deep and the red blood began to spurt. Morton immediately dropped the ax and, grasping his leg in both hands, squeezed it tightly above the cut. The bleeding almost instantly decreased, though it did not stop entirely.

"Get a piece of rope!" Morton cried to Tom. "I've cut myself!"

There was some rope two hundred yards down in the woods where the boys had been dragging out spruce logs, but instead of running to get it, Tom, who realized from the note of emergency in his friend's voice that the cut was serious, pulled off his khaki belt and hurriedly began to make a tourniquet. A few minutes later the two boys were on their way out of the woods. At a point where the trail joined a highway they encountered an automobile, and within an hour a doctor was taking stitches in the leg.

The Tourniquet

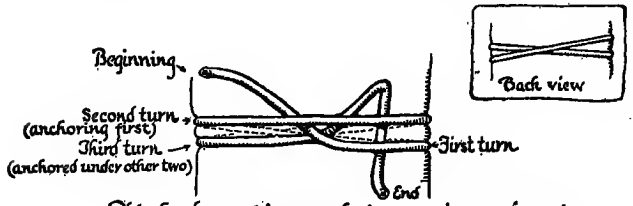
A tourniquet is any band put so tightly round a limb that it stops the flow of blood in the arteries or veins. The commonest tourniquet is a piece of strong thick cloth wound round a limb loosely and tightened by twisting a small stout stick put part way through it. Tighten the tourniquet until



A Tourniquet

the blood stops flowing, then keep the stick in position by holding one end against the limb with a piece of string or cloth. Be careful not to pinch the skin as you twist. A piece of rubber tubing from an automobile gas tank makes an excellent tourniquet which needs no stick to tighten it. Wind it around several times, then push the end under the last turn to hold it. A long stocking is another good substitute because it is both soft and elastic.

After you have put on the tourniquet you will see that the part of the limb below turns a dark bluish color because you have shut off the circulation. You know that the body will die if the circulation is stopped. Just so that part of that limb will die (the doctors say "gangrene will set in") if it does not have a fresh supply of good blood once in a while. So, if your tourniquet must be left on



Method used in applying a tourniquet of rubber tubing

a long time before you can get to a doctor, loosen it once an hour till the color in the limb returns, even if the wound bleeds freely while you are doing it. Then readjust the tourniquet and let it remain tight for another hour. While it is loose press your thumb just above the wound; that will stop most of the bleeding. There are many little bypaths through which the blood can reach the rest of the limb.

Sometimes you can get more pressure on an artery by slipping a round stone or a roll of band-

age under the tourniquet in such position as to press directly on the blood-vessel. For instance: when the bleeding is below the knee, force the round object deep in behind the knee, then bend the leg on it till the heel comes up against the buttock; hold the leg bent in that position by bandages.

Scalp wounds bleed very freely, for the scalp is well supplied with blood. But take a few turns of bandage tightly round the head where the rim of your hat comes and see how quickly the bleeding stops.

Where there is hemorrhage from a wound in the neck, whether from an artery or from a vein, you are in a fix. You cannot put a tourniquet round a man's neck and twist it tight, because you will choke him. You don't want to kill him in order to save his life. If the bleeding is from a vein the best treatment is to force a sterile compress tightly into the wound and hold it there for some time with your hand. If it is from an artery you are almost helpless; the only thing to do is to see just where the spurt is coming from, then reach into the wound with your fingers and try to pinch the cut end of the artery—the end toward the heart. In this *one* case never mind whether or not your fingers are clean; you have no time to wash them and you must save the man's life even at the risk of causing "blood poisoning" in the wound.

The First Thing in All Emergencies

Whenever you find a man bleeding, stop that first, no matter what else may be wrong. Then look for shock and treat it. And remember again that some people will be thrown into a state of shock by only a little hemorrhage, especially if they see the bleeding.

In Short

In short, the treatment of a person who is bleeding is: first, stop the hemorrhage; second, don't let your patient see the blood or the injury (this is true of all bad injuries); be cheerful and comfort your patient; actually smile; third, treat shock, if present (see Chapters I and III); especially keep the patient's head low, to let whatever blood he has left run to his head.

And don't forget to have someone punch, kick, or blow up the fellow with the long face who always hangs round an accident and talks about how terrible it is.

Unseen but Dangerous

There is another kind of hemorrhage that may occur when a person has been injured internally, as when he has fallen a long distance or when his body has been crushed. This is internal concealed

hemorrhage. That big name means that a blood vessel inside the body has been broken open and is bleeding there.

It usually happens in the abdomen, which is the big cavity in the lower half of the body, filled with important organs. These organs, such as the stomach, intestines, liver, spleen and kidneys, are supplied with blood by fair-sized arteries. Usually the bleeding is from these arteries; but sometimes the liver or spleen or kidneys themselves are split open by a fall or a crush and bleed badly. The blood runs into the abdomen and does not, of course, appear on the outside; in fact, a person may bleed to death in that way without a drop of blood being visible.

"But if we can't see the bleeding," you may say, "how on earth can we tell when it happens?"

By watching the signs. Any person who has been badly crushed or has fallen far will be in shock anyhow. If he then grows still more pale, if his pulse rate goes steadily higher (find this out by taking his pulse every fifteen minutes and keeping a record of it), if he grows very thirsty, and if he begins to feel as if he could not breathe and gasps for air—then you can be pretty sure that he is bleeding internally.

There is no first aid treatment for this; you cannot put a tourniquet on an artery inside your

patient; you must *at once* get him to a doctor who may have to operate.

SUMMARY

Blood from an artery spurts and is bright red.

Blood from a vein flows steadily and is dark red or purple.

Bleeding from an artery is more dangerous than from a vein.

Severe hemorrhage always causes shock; slight hemorrhage often does.

Treat hemorrhage first; then look for shock.

After falls or crushing accidents look for signs of internal hemorrhage—rising pulse rate, increasing paleness, thirst and "air hunger" or gasping for air.

Remember that your patient looks to you for comfort as well as for treatment. Therefore keep your head, know what to do and do it with a smile.

CHAPTER V

SUNSTROKE AND HEAT EXHAUSTION

SUNSTROKE and heat exhaustion are caused by the same thing, too much heat, but they are quite different; as different, in fact, as ice and steam, which have only this likeness, that they come from the same thing—water. If you treated a man with sunstroke as if he had heat exhaustion you might easily make him worse—very likely would take away his chances of getting better.

Let's see how it happens that these two different conditions are caused by the same thing. You know that the temperature of a healthy man is close to 98.6°, even in freezing weather. Where does all that heat come from? In the case of a fire the heat is the result of the burning of the fuel. In the body it is true that fuel is burned too; the food that we eat is burned—very slowly, of course, and not fast enough to give as much heat at one time as the wood in the fire does, but fast enough to keep the body warm. And it is a curious fact that food gives off exactly as much heat when it is burned in the body as it would if you threw it in

the fire. So that if you could digest a stick of wood, you would get as much heat out of it as if you burned it in your grate.

In fact, so much heat is manufactured in the body that we must always be losing some of it or we would soon become too hot. In winter, when the air about us is cold, we lose more heat than in the summer; therefore we eat heartier food that will give us more heat when it is burned, and put on heavier clothes to keep the heat from passing off into the cold air. In summer, when the air is as warm or warmer than our bodies are, less heat escapes from us; therefore we need to produce less heat and so we eat less hearty food and wear loose, light clothes in order that extra heat may be easily lost.

You see, the balance between the heat that we produce and the heat that we lose must always be kept at 98.6°.

Heat is produced in the body in this way: the food that we eat is digested and absorbed into the body and stored in the liver and other organs. From there it is carried to the muscles and burned when the muscles are in action, setting free the heat. The blood picks up the heat and distributes it about the body.

It is lost in several ways. Much of it escapes directly into the air, some is lost in the warm breath

and a good deal disappears when the sweat evaporates.

If we manufacture a great deal of heat by running or working hard, the temperature of the body tends to go up too fast; then the sweat pours out on the skin in great quantities and helps to get rid of the extra heat.

Suppose that on a hot day a man is working very hard. He is developing heat faster than he can lose it. The result will be that his temperature will soon rise above 98.6°. That will never do; he must either lose more heat or produce less, or take the consequences. If he keeps on working, two things may happen: either his temperature will actually rise far above the normal—that is what we call sunstroke—or Nature will step in and force him to stop producing heat. The only way that she can do that is to slow down all his machinery —not only the muscles of his arms and legs but those of his heart and breathing apparatus too; so that we may say that the man is in a depressed condition.

Perhaps you will remember that we spoke once before of a condition in which the patient was like an engine slowing down, and that we called that condition shock. This second effect of great heat in the air is nothing but *shock from heat*—and that is what we call heat exhaustion.

HEAT EXHAUSTION

If heat exhaustion is shock from heat we know at once that it belongs in group A and just what the signs of it are. The patient will be somewhat dull or very drowsy, pale, with shallow respiration and weak, rapid pulse and a cool skin covered with a cold sweat. If you should take his temperature with a thermometer you would find it below 98.6°. That seems strange when you think that the cause of heat exhaustion is too much heat on the outside of the body; but remember Nature has tried to save the patient by cutting down the heat production and has done it in the only way she can—by throwing the patient into shock. Of course, shock always has the same signs, no matter what the cause is.

SUNSTROKE

If you have ever seen anyone who is suffering from sunstroke you will remember that his face was more or less red. That sign belongs in group B. Sunstroke is the first condition we have found in group B. In that group, you remember, the patient is entirely unconscious, his face red, his breathing slow and noisy, his pulse slow and full and his temperature above normal. In sunstroke, too, the skin will be dry—without sweat. In fact, the absence of sweat is one of the reasons for the patient's

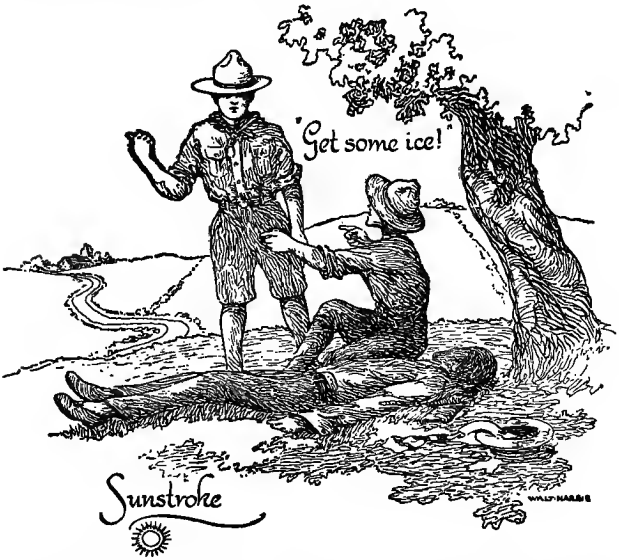
condition. He has lost one of the best means of getting rid of his surplus heat, so that nearly all the heat he is making is stored up in him. If you should take his temperature with a thermometer you would find that it is up to 105° or more—often as high as 107° or 108°, sometimes as high as 112° or 113°.

Treatment

If you will remember that in sunstroke the temperature is above normal and that in heat exhaustion (which is shock from heat) it is below normal, you will not forget what to do. In sunstroke you must get the heat down to normal again and in heat exhaustion you must raise it to normal. The treatment for heat exhaustion is the treatment for shock—warm and stimulate. Get the patient into a cooler place than he has been in, cover him with warm clothes, rub his limbs toward his heart under the clothes and give him a cup of black coffee or half a teaspoonful of aromatic spirits of ammonia in half a cup of water.

For sunstroke, get the patient into a cold place and bathe him with cold water. The best way to do this is to undress him and bathe him all over with cloths wet in ice water. If he does not become conscious soon with this treatment, get him into a tub of cold water with ice floating in it, taking

care of course not to let his head slip under the water. All the time you are doing this rub his limbs vigorously. When he is conscious, give him all the ice water he wants to drink.



Remember that a person with a mild case of sunstroke may be simply dizzy and red and may vomit.

Of course, in either case, you will get a doctor as soon as possible.

Persons who have had one sunstroke are likely to have another unless they take precaution.

How They Happen

Usually sunstroke happens to persons who are working in the hot sun, such as farmers, teamsters and ditch diggers. If you ever have to work in the sun in summer, get a big straw hat with plenty of ventilation or else put some green leaves or a wet cloth in the crown.

Heat exhaustion usually happens to persons who are working in a hot place, out of the direct rays of the sun. A foundry or a boiler room on a steamship or in a mill is a likely place for heat exhaustion. It frequently overcomes old people who are out on the streets on a hot day, but oftenest of all it happens to men who are in the habit of taking beer or whiskey.

But—

Sometimes people in the hot sun have heat exhaustion and sometimes those in a hot place out of the sun have sunstroke. You cannot tell which condition a man has until you have studied his signs and decided into which group they fall.

SUMMARY

Sunstroke.

1 Cause—Great heat. Usually hot sun shining on head. Alcoholic drinks help to cause it.

2 Signs—Group B: Dizziness, vomiting, feeling of great heat, headache, perhaps convulsions, usually unconsciousness, flushed face, slow respiration and pulse, temperature up to 107°-113°, skin hot and dry.

3 Treatment—Group B: Reduce temperature by external cold, and by cold drinks when patient is conscious.

4 Prevention—Keep out of hot sun on hot day. Put green leaves (plantain) or wet cloth under your hat. Avoid alcoholic drinks.

Heat Exhaustion.

1 Cause—Great heat, usually out of sunshine. Alcoholic drinks help to cause it.

2 Signs—Group A: Consciousness dulled, color pale, respiration shallow, pulse rapid, temperature low (97°-96°).

3 Treatment—Group A: Warm and stimulate.

4 Prevention—Keep in good health in warm weather. Eat lightly, drink much water, keep bowels open. Avoid going out in heat of day. Never take alcoholic drinks.

CHAPTER VI

CONCUSSION, SKULL FRACTURE, APOPLEXY, ALCOHOLIC INTOXICATION AND EPILEPSY

ONE day last spring a college baseball team was practicing for its championship series. Every player was on his toes. The pitcher wound up and put the ball cleanly over the plate. The batter struck it squarely and sent it out low, straight and hard down the center of the diamond. The pitcher, off his balance, threw up his hand, but he missed the ball and it struck him a hard, glancing blow on the side of the head. He stumbled, put his hand to the spot and dropped. The other members of the team ran to him and took him to the college hospital. It was late that night before he began to grow conscious; but he improved steadily and two days later was back in the game.

That was a bad case of concussion—of being "knocked out." Slight cases are happening every day. Perhaps you fall on the ice, hit the back of your head and don't know anything for a few minutes, or, in such a game as Flag Raiding, you and another scout run together hard and strike your

heads; or, if you live in Africa, a ripe cocoanut hits you on your topknot. Or perhaps a big beam, lifted by a derrick, swings round and strikes a workman on the head. It is always some sort of blow on the head. The brain is violently jarred and stunned into unconsciousness for a minute or longer.

Those are all simple cases for which the treatment is simple. Proceed as in fainting. Lay the patient down in a cool place, loosen tight clothing at his neck and belt, sprinkle cold water on his face and chest and let him smell of a cloth wet with our old friend aromatic spirits of ammonia.

SOMETHING WORSE—SKULL FRACTURE

The thug with his blackjack intends only to stun you so that he may rob you at his leisure, but instead of merely stunning you his small heavy sandbag may crack your head. In that case a blood vessel inside the skull is very likely to be injured and a hemorrhage may occur between the bone and the brain, pressing on the brain and causing serious injury. This bleeding may be small and slow but steady, so that it may be hours before its effects will appear.

Whenever a person is struck or falls on his head be on the lookout for a skull fracture. In deciding about it do not trust to your own judgment; but if the person does not regain his consciousness

within five or ten minutes, especially if he is bleeding from nose or ears, or if the pupils of his eyes are unequal in size, have a doctor see him at once. Two doctors worried over the baseball pitcher several hours before they were sure that his skull was whole.

APOPLEXY

You may have heard your mother say that someone she knows has had "a stroke" or "a stroke of apoplexy." She means that the person either has suddenly become unconscious or is paralyzed in arms or legs or both; perhaps he cannot talk, even after he has become conscious. This condition usually comes on without any warning at all; sometimes it happens after the person has been straining at his work or running for a train; but sometimes it happens when he is sitting quietly or is in bed.

The cause of apoplexy is the bursting of a blood vessel in the brain. It usually happens in old people because their arteries grow brittle and break easily. The clot that forms injures the parts of the brain that regulate the speech and the motions of the arms and legs, so that what you see happen is this: an old man, perhaps, is hurrying for the car. He may appear to be perfectly healthy. Suddenly he falls. You find that he is unconscious; you run over in

your mind the four other signs that usually go with unconsciousness and find that his face is flushed and red, his respiration slow, deep and noisy, his pulse slow and full and his skin warm. Perhaps he is restless and mumbles something. Since all this falls in group B, since nothing has struck his head and since there is no smell of alcohol on his breath, you decide that he has apoplexy.

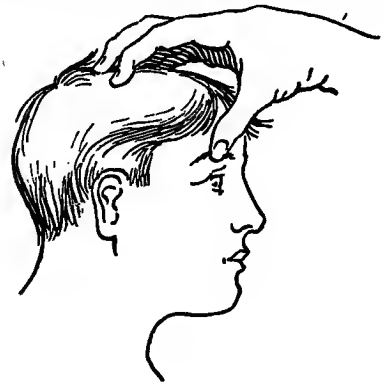
Everybody is very much excited and each one wants to do something different. But because you are a scout and are prepared, you will keep your head and will remember that the treatment for group B is to get the patient to a cool place, keep him quiet, loosen his clothes and keep people away. If he is restless you will see to it that he does not harm himself. You will raise his head because you do not want any more blood to get to that broken vessel in his brain than you can help. You will send for a doctor, of course. Above all, you will not use any stimulant, for that will only make his heart work harder and may increase the bleeding into his brain.

When you have done those few things you have done all that you can. Leave the rest to the doctor.

Apoplexy is sometimes wrongly called "a shock." It has nothing to do with surgical shock. One is in group B, the other in group A. Stick to the name apoplexy and you won't become confused.

ALCOHOLIC INTOXICATION

It is not always easy to decide whether a man is only very drunk or whether something more serious is the matter. If he is so intoxicated that we say he is "dead drunk" he will be unconscious and paralyzed for the time being and his condition may be easily confused with apoplexy. Or perhaps he



has fallen and struck his head while moderately drunk and is unconscious from concussion; at the same time he may have a small skull fracture which you may not discover. In that case, the bleeding inside the head may not show any signs for several hours. It is not safe, you see, to decide that a man is nothing more than drunk merely because you can smell the odor of alcohol on his breath.

If there is any doubt in your mind at all, get a doctor at once. While you wait for him, pour some aromatic spirits of ammonia on a handkerchief and hold it very close over his nose and mouth. Be careful not to get any in his eyes. If he is drunk he will probably turn his head to get away from the stifling smell or try to push your hand away; perhaps you can even bring him out of his deep unconsciousness in this way. Another way to rouse him is to press hard with your thumb in the middle of his eyebrow. You will find there, in most people, a tiny groove in which runs a nerve, called the supra-orbital. Press hard on this little nerve in your own eyebrow; you will soon find the pressure too painful to bear.

If the patient rouses considerably with pressure on this nerve or with the ammonia, if the pupils of his eyes are equal in size, if he moves *both* arms and legs himself (so that you are sure he is not paralyzed) and if you find no bump on his head, you may be fairly sure that his condition is due to liquor alone. In this case make him vomit if you can by tickling his throat with a straw or a feather, and when he is conscious give him a big dose (1 to 2 teaspoonfuls) of aromatic spirits of ammonia and an ounce of Epsom salts in a full glass of water.

On the other hand, if you think there is any

possibility of apoplexy or a skull fracture, do not by any means trust your own judgment. A few years ago you could read in the papers every little while that the police had locked a man in the station, supposing that he was intoxicated. In the morning he would still be unconscious and perhaps paralyzed. A doctor would be sent for and would find that the patient had a fractured skull or an attack of apoplexy. A mistake like that is serious business, for the man might die during the night for the lack of a doctor's care; but fortunately it happens less and less often now, for officers are well drilled nowadays in first aid and will take such a man to a doctor before they lock him up.

Do not be fooled by the patient's breath. Some misguided person may have found your unconscious man before you and may have poured liquor into his mouth in an ignorant attempt to revive him.

EPILEPSY OR "FITS"

A fit of epilepsy comes on suddenly; in fact, the word means something that "leaps on" the person. Sometimes epilepsy is called the falling sickness, and the Bible speaks of it as "having a devil."

It belongs in this chapter because it is caused by something wrong in the brain—no one knows what; but you need not bother about the five signs

because there isn't time and because you never will mistake epilepsy for anything else.

The fit comes on anywhere at any time. The person suddenly cries out in a queer, hoarse way, straightens out, falls and becomes perfectly rigid. He does not breathe and quickly gets purple in the face. After half a minute or so he relaxes a little and begins to shake violently, throwing his head and limbs about and catching his breath in great gasps, so that the saliva is churned into foam. These jerky movements gradually grow less violent and stop, leaving the patient limp, exhausted and still unconscious. He may become conscious soon, though he probably will be dazed for a while; or he may drop into a heavy sleep that lasts for several hours. The whole fit occupies only two to five minutes.

You see that a fit of this kind is not a pleasant thing to watch. People who are not prepared are likely to leave the poor fellow to himself. But a scout must know what to do; and this is very simple: keep the man from hurting himself. He is likely to bang his head about and especially likely to bite his tongue. So get something soft and not too large under his head, such as a loosely rolled coat, and slip something between his teeth to keep his mouth partly open. For this, take something wooden about as large as the base of your thumb,

such as the small handle of an umbrella, or half a newspaper rolled tightly, or the end of your coat sleeve gathered together; slip it between the person's back teeth, and look out that he doesn't bite your finger.

Don't try to hold him still. He is very strong in these attacks and might hurt you. Call a doctor or an ambulance. Loosen tight clothing. When the fit is ended get the person into a warm, quiet place.

SUMMARY

Concussion, skull facture, apoplexy, alcoholic intoxication and epilepsy may all cause unconsciousness. Often the diagnosis between them is very puzzling. The following summary is not meant to tell the whole story; but it is, however, suggestive.

Concussion

Caused by a blow on the head or on the spine; unconsciousness at once, lasting from a few seconds to several hours. Keep the patient quiet and warm; cold to head. Get a doctor.

Skull Fracture

Caused by injury to head; usually a bruise or cut somewhere on the scalp; pupils of eyes unequal in size; often bleeding from mouth or nose, or from the ears. Unconsciousness

and inequality of pupils may come on slowly some time after the injury. Keep quiet and warm. Get a doctor at once. Cold to head. Do not stimulate.

Apoplexy

Sudden paralysis or unconsciousness or both. Usually in people over forty. Face red, respiration deep and noisy, pulse slow and full, temperature little changed, pupils unequal. Keep quiet and warm. Raise head. Get a doctor.

Alcoholic Intoxication

Unconscious or very dull, face red, respiration and pulse little changed, temperature probably lowered. Alcohol on breath. Can be roused by supra-orbital pressure or by smelling of ammonia. Always remember the possibility of some other condition besides the intoxication. If patient can be roused, pupils equal, no paralysis, no head wound, make him vomit and give him, when conscious, one to two teaspoonfuls aromatic spirits of ammonia and one ounce Epsom salts in a glass of water. Get a doctor.

Epilepsy, "Convulsion," "Fit"

The convulsion is so typical that it will never be mistaken for anything else. Keep patient

from hurting himself, especially from biting his tongue. After the fit, keep quiet and warm. Stimulation does no good. Get a doctor.

CHAPTER VII

INFECTION AND "STAPHY"

THIS is the story of a germ named Staphy. That, at least, is what his chums called him, for his real name, which was *Staphylococcus pyogenes aureus,* was much too long to say often. One of his cousins had a still prettier name—*Diplococcus intracellularis meningitidis.* In spite of their long names Staphy and all his relatives were very tiny fellows; they frequently held dances on a pinhead and a watch crystal made a splendid camping ground for whole armies of them. Staphy himself and all his sisters and brothers and first cousins were round; but some of his distant relatives were like short little rods or tiny corkscrews. Before microscopes were invented no one ever saw any of them; but though they were so tiny, they caused a lot of trouble in the world because there were so many thousands of millions of billions of them everywhere, and, as doctors eventually found out, some one or other of them was responsible for nearly every disease.

They lived in almost any place—in dirt, on house walls, in milk and water, on people's clothes and

skins and in their mouths, and some of them even lived inside of people.

It didn't take much to make Staphy happy, he got along well almost anywhere. He wasn't afraid of cold, for that couldn't hurt him; but he kept out of the way of fresh air and sunshine and those things that are called antiseptics, such as high temperatures or boiling water, or tincture of iodine or alcohol; for all those things kill germs. Germs are only little plants, anyway, and not animals; and it is easy to kill them when you go about it right.

But when Staphy found a warm, moist place that suited him he set out to grow and raise brother and sister germs. He did it in a queer way—simply got a little bigger and then calmly split into two pieces. He hadn't any bones, but was made of a jelly-like substance, so that it was easy for him to split. Each of the new germs soon split again, and each of these again, and so on, until in a day or so there were more brothers and sisters than you could count in a week; and they all looked exactly alike.

When Staphy and his relations sat down and talked about where they would like to live, they all agreed that Mr. Man's house was the finest place they could think of. In among his muscles and bones and tendons and blood vessels it was always warm and moist. But there were two objections:

first, Mr. Man wore all over his body a tough covering of skin through which no germ, unaided, could ever hope to get; and second, if the germ should find a cut in the skin and get through, there were the terrible white corpuscles of the blood that would work their way out of the blood vessels and over to where the germ was and eat him up. The germs' only hope was to get a crowd together and all go in at once; then there would be a great fight between them and the white corpuscles, and many would die on both sides and for a little way round the battlefield the muscle or bone would be killed, too. People would say that an abscess had formed; and by and by it would break out or the doctor would open it with a knife and all the dead muscle or bone and the dead germs and the dead white corpuscles would run out. People called it pus.

And finally, if Mr. Man were strong enough, his white corpuscles killed off all the germ family and the abscess got well; but if Mr. Man didn't have a good constitution or if he hadn't lived a clean, straight life, sometimes the germ family grew too fast for their enemies and spread all through Mr. Man. So by and by Mr. Man died. Or perhaps, before it got as bad as that, the doctor said he had "blood poisoning" in his arm or in his leg, and in order to save Mr. Man's life he cut off the bad limb.

It happened one hot July day that Staphy and a few million of his relatives were lying in the dust of a country road down which was coming a troop of scouts. A wagon passed and stirred up the dust. Away it went in a thick cloud, drifting before the summer breeze; and on one of its tiny particles away went Staphy and several thousand of his relatives, too. The dust blew in among the scouts, who turned their backs and shut their eyes; and Harry Phillips wiped his sweaty face with his handkerchief.

It happened that the particle of dust on which Staphy rode found lodgment on Harry's sticky face and was wiped off on his handkerchief.

The troop turned into the woods soon, found their lean-to, and began to look for firewood. Harry, who was only a tenderfoot, had not yet learned how to use his hatchet and had cut only a few notches in his sticks before he cut one on the back of his wrist.

George Wright, one of the patrol leaders, heard his exclamation and looked up.

"That's too bad," he said. "Come over here and let me help you fix it up."

"Oh! it's nothing," Harry answered. "It isn't bleeding much. I'll just wrap my handkerchief round it and it will be all right."

If *Staphylococcus pyogenes aureus* (who is

Staphy for short) had been anything except a tiny plant—if he could have heard what Harry said—he would have jumped for joy; for there he was with his relatives on that very handkerchief, aching for that very chance to get under someone's skin and begin to grow.

George Wright was a first-class scout. Although he didn't know about Staphy in particular he had learned that germs are everywhere and that nothing must touch a broken place in the skin, whether from a cut, burn, blister or what not, except something that is free from germs.

"No! Don't do that!" he cried to Harry. "Don't use your handkerchief. It isn't clean."

"Sure it is," Harry called back. "Came out of my drawer just before we started."

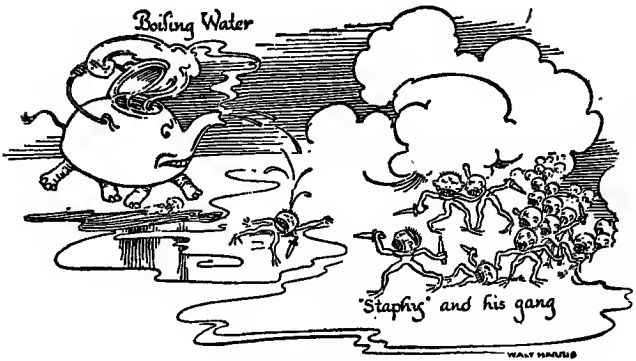
"I don't mean that," laughed George. "I mean *clean*—without any germs. There are plenty of them on your handkerchief, because I saw you wiping the sweat off your face with it a little while ago. Come over here and we'll fix you up right. Oh, Stan," he called to one of the other scouts, "bring your first aid outfit over here."

"Forgot it," called back Stan. "Sorry." Stan was always forgetting; that's why he was only a second-class scout after fourteen months in the troop.

"Thunder!" exclaimed George. "No sterile

bandage!" (He meant one without germs.) "We'll have to boil up a dressing. Let's see your handkerchief, Harry."

The wound was bleeding a little now, but it was dark blood and did not spurt, so George knew that it was only a vein that was cut—a small one. At his direction, Harry grasped his wrist below the



cut with his other hand and was surprised to see the bleeding stop.

"There doesn't seem to be any dust in the air here," said George, "so it won't do any harm to leave the cut uncovered a few minutes."

By this time the fires were started and water was heating. George took Harry's handkerchief (with Staphy and a great many of his relatives on it) and folded it as if it had just come from the

laundry. Then he laid it in a pan of boiling water and let it boil for ten minutes. He knew that no germ could stand that, and that the handkerchief would then be free from germs and safe to put over the wound, providing that he was careful not to let any fresh germs get on it.

So this is the end of Staphy and his companions. When the ten minutes were up they were all dead, and a dead germ can't hurt anyone.

George had been washing his hands in a brook nearby for several minutes and drying them by waving them in the air, being careful not to touch anything with them. This was to wash off all the germs he could before he touched the boiled handkerchief. Then, dipping his fingers quickly into the boiling water, he got hold of one extreme corner of the folded handkerchief and, holding it up, waved it back and forth in the air to cool it, changing his fingers often, but being careful not to touch more than the one corner. When the handkerchief was cool enough to handle, he folded it tightly, still touching only corners, and wrung it out with two or three quick twists. Then he opened it till he came to an inside surface which he was sure he had not touched with his fingers; this he turned next to the skin and laid it carefully over the wound, taking pains not to move it while he put on a bandage, for fear that germs from the neighboring skin

would be dragged into the wound and infect it.

The word "infection" comes from two Latin words meaning "putting something in." George Wright took all these pains to avoid putting any germs into Harry's wound. A doctor dressed it that night, and the next week, when the troop came again to the lean-to, Harry's wrist was healing nicely.

If Stanley Hopkins had only remembered his first aid outfit, all of George's trouble would have been avoided. Every good first aid outfit includes one or more small packages containing sterile (germless) dressings wrapped in such a way that they remain sterile for months. It had been the plan of George's patrol—and a very good one, too—always to have one or two of these packets with them on every hike.

If Staphy had been on Harry Phillips' hatchet blade, instead of on his handkerchief, he would have been carried straight through the skin into the wound. Once in, no amount of sterile dressings could harm him or get him out; they would only keep new germs out. In that case something more would be needed, something that would go into the wound after Staphy and kill him—that is, an antiseptic. George knew that when a doctor can be reached within two or three hours, as in

Harry's case, it is better to leave the wound alone except for the sterile dressing. If he had been off on a two or three day hike he would probably have carried with him several of the little glass ampules of tincture of iodine, such as are sold by the American Red Cross, or else a two-ounce bottle of it. A little of this, he knew, poured into a cut or spread on a scraped surface with a brush or with a piece of clean cloth, would be almost sure to kill any bacteria (for that is the proper way to speak of germs) that might have gotten into the wound. His scoutmaster had told him that the soldiers in the Great War were provided with little boxes containing an ampule of iodine and a sterile compress and bandage, and that, by killing the bacteria already there with the iodine and by keeping new ones out with the sterile compress, many wounds had healed without infection and many soldiers' lives had been saved.

If tincture of iodine had not been handy George might have used alcohol, 70 per cent pure, which must always be kept tightly corked to prevent it from absorbing water from the air and so losing strength.

If no antiseptics were handy, if the doctor could not be reached for a number of hours, and especially if dirt had been ground into the wound, George, after thoroughly cleansing his hands, would have

washed it out gently with a sterile cloth wet with water boiled ten minutes and cooled. In the city, tap water is virtually free from Staphy and his unpleasant family, but brook and lake water should always be boiled.

Peroxide of hydrogen is excellent as a mouth wash and for deep punctured wounds, such as that made by a nail, but its value as a general antiseptic is so small that it is not worth while to bother with.

Staphy Germ—or Staphy Bacterium, as we must call him now—has introduced us in this chapter to those accidents that are not immediately dangerous to life, but that through infection may later become so.

SUMMARY

Bacteria, especially those varieties that produce pus, exist everywhere.

The skin is a protection through which no bacterium can penetrate. Therefore any break in the skin (as in scrapes, cuts, burns, compound fractures) opens the way for infection.

Aseptic dressings are those in which the bacteria have been killed by some antiseptic. For example, a cloth boiled for ten minutes is aseptic.

Antiseptics include boiling water, tincture of iodine and 70 per cent. alcohol.

The ideal way to treat a small break in the skin, such as a scratch, a cut or a hole torn by a broken bone, is to put tincture of iodine into it and cover it with a sterile compress and bandage. Avoid court plaster and collodion, also "surgeon's plaster" or adhesive tape, except for holding a bandage from slipping out of place.

CHAPTER VIII

BURNS AND FROSTBITES

WHEN you boil an egg two things happen to it; it hardens and becomes a dead egg that will no longer hatch. Since the substances in an egg are somewhat like the substances that make up our skin and muscles, it is easy to believe that great heat has somewhat the same effect on our flesh as it has on an egg. In fact, heat cooks and kills our flesh exactly as it does the egg. It makes no difference whether it is dry heat (hot iron, flame) or wet heat (steam, hot liquids) or the sun's rays or an electric current. The effect is the same.

Three Degrees of Burns

Of course some burns are worse than others, and a bad burn needs treatment that is very different from the treatment that you would give to a slight one. For convenience, we say that there are three degrees of burns, and distinguish them by the depth to which the heat penetrates.

First Degree

After a first degree burn you find the skin reddened and smarting a little; but unless the damage is spread over a large area there is no danger. You know that the surface of the skin is hardened, for you feel uncomfortable—probably much as a snake feels before it sheds its coat—and the skin certainly is killed, for in three or four days it begins to come off in tiny white patches, leaving healthy new skin underneath. Burns of this degree are, fortunately, more common than those of other degrees.

The commonest cause of first degree burns is sunshine—the ordinary sunburn without blisters. It occurs under other conditions, of course—for instance, when you pass too near a flame or dip your hand into very hot water, or spill some liquid on the hot stove and let a cloud of steam rise in your face.

The simplest treatment is to cover the burn with baking soda, or to keep round it cloths wet with a solution of baking soda—one teaspoonful to a pint of water. Greasy substances relieve the pain a great deal, such as olive oil, castor oil, Carron oil (linseed oil and lime water, equal parts), lard and carbolized vaseline. Cold compresses help. Picric acid gauze is excellent. *None of these, except the last, should be used where the skin is broken, for fear of infection.*

Second Degree

Second degree burns are followed not only by redness but also by blisters, because the injury to the skin has penetrated to the lower layers. These swell and the skin is lifted up in humps filled with fluid. At the same time there is considerable pain.

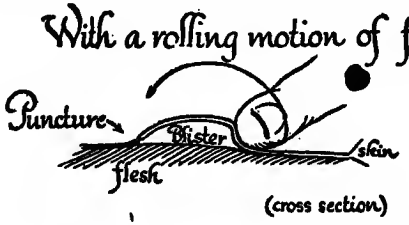
The only difference in the causes of first and second degree burns is that in the second degree the heat is greater or is in contact with the skin for a longer time. Severe sunburn is the commonest example of this kind of burn.

Sunburn deserves an extra word in regard to prevention—an ounce of which, you know, is better than a pound of cure. Each summer, in spite of warnings and previous sad experience, blistering sunburn adorns—or rather disfigures—the arms and shoulders of thousands of boys and men. They are the ones who try to get "a good tan" in a single day and the result is—misery. A good scout does not allow himself to be caught napping by Old Sol. He exposes his arms and shoulders gradually —half an hour the first day, an hour the second and so on until his skin has become accustomed to the sun—and every morning he rubs on a little olive oil, which keeps his skin from cracking and helps to make a perfect tan.

A second degree burn is dangerous for two rea-

sons: first, because, if it covers a large area of the body, the intense and continuous pain that it causes is very likely to bring on shock; second, if the skin of the blisters is rubbed off, a raw surface is left which is easily infected.

In treating second degree burns, therefore, you must watch for shock and treat that first; leave the rest to the doctor. If you cannot reach him for hours, wash the blisters with alcohol and prick them



with a needle dropped in alcohol or made red hot in a match flame. Prick them near the good skin and press the contents out with a clean cloth, putting pressure first on the side opposite the prick. If they refill, re-empty them, with the same care against infection. Always cover them with a sterile gauze compress. Never use absorbent cotton next to a wound; the fibers stick and prevent rapid healing; bandage it in place on top of the gauze compress if you wish.

If the burned skin round the blisters is unbroken, apply to it the remedies spoken of above; but wherever it is broken or rubbed off, that place must be

treated as an open wound and covered with a dry sterile dressing. If there is dirt on the raw surface, paint it with tincture of iodine or alcohol, 70 per cent, before putting on the compress.

Third Degree

In third degree burns the damage extends to the flesh below the skin. You will see that the skin is blackened and cracked and perhaps that it has fallen away from the flesh in places. The pain is terrific and deep shock comes on almost immediately.

Such a burn is usually the result of getting the clothes on fire or of falling into a tub or a tank of hot liquid or of coming into contact with a heavy current of electricity.

First aid for a bad burn like this is mainly to treat shock and to get the patient to a doctor or to a hospital as quickly as possible. If the burn covers one-third or more of the body he will almost certainly die in a few hours. You have no time to spend in worrying about infection. Wrap up the burned parts in the cleanest cloths you can find—either dry or wet with baking soda in water—wrap the patient warmly in blankets, stimulate him, keep him quiet and see that a doctor reaches him without delay.

Warning

It is strange but true that a big first or second degree burn is worse than a small third degree burn. So always watch your patient for shock and be ready to treat him for it.

Never pull clothes off a burned surface, for fear of pulling off skin with them. Cut round the burn and leave an island of cloth for the doctor to remove.

FROSTBITE

In cold weather you may suddenly realize that your toe, finger, nose or ear has lost its feeling. If it is white you can be sure that it is frozen.

The treatment is not to warm it quickly, but to rub it hard first with snow, then with cold water. Very slowly use warmer and warmer water until the skin gets back its pink color.

SUMMARY

Burns, unless small, are always serious injuries. Watch for shock. Extensive burns are frequently fatal within a few hours.

Burns are of three degrees:

First: Reddening of skin with burning sensation. Treatment—baking soda as powder or in water, olive, castor or Carron oil, lard, carbolized vaseline, wet compresses.

Second: Reddened skin, blisters, swelling of part, pain, perhaps shock. Treatment—prick blisters with sterile needle, use remedies as above, cover raw surfaces with sterile compresses, get a doctor.

Third: Scorched or blackened skin, swelling of part, perhaps skin cleaves away from the flesh, terrific pain, great shock. Treat for shock, cover burns with clean cloths, dry or wet in baking soda water. *Get a doctor.*

Frostbite is known by the white color of the part and the lack of sensation in it. Treatment: rub with ice or snow and cold water; use warm water *very slowly.*

CHAPTER IX

POISONING

SOMEONE once said that a weed is a flower gone astray. In the same way it is true that a poison is a good substance in the wrong place. Almost all the poisons may be used in small quantities as medicine for various diseases without harming the patient; and many of the things that we swallow every day without thinking of any danger would become poisons if we took enough of them. Coffee and tea contain poisons, in small quantity, and tobacco is so poisonous that at first it often makes the person sick who tries to smoke it. Copper is a poison, yet peas, beans, oysters and bread contain traces of it. Horse-radish belongs to a poisonous family of plants, while many seeds, notably apple seeds, almonds and peach stones, contain traces of one of the most violent poisons known. And so on. Remember that this is true even when these articles of food are as pure as we can get them.

Poisons, you see, are not always fatal. A few of them work very quickly—so quickly that even

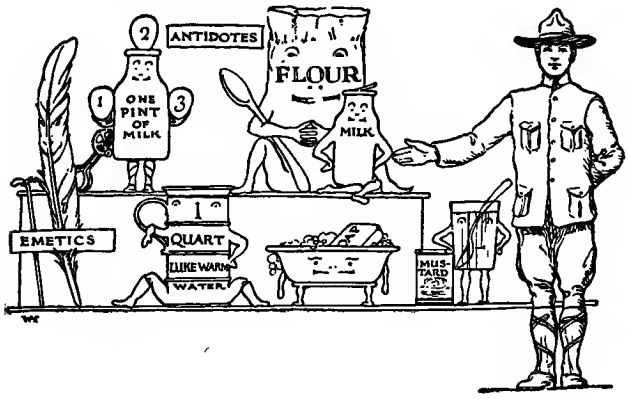
if a doctor were near at hand he would not be able to save the patient; but most of them work more slowly, so that, just as in hemorrhage, you have time to stop and think what you shall do.

Two Things to Do

Two things you must do in every case. Those are to empty the stomach of the poison that is in it, and to give an antidote. An antidote is something that prevents the poison from injuring the body.

If a doctor could treat the patient immediately he would put a long rubber tube down the man's gullet and through it wash the poison out of his stomach. You will not be able to do that, of course. The best you can do is to make the man vomit. Very often you will find that he has already vomited; it is Nature's way, when we have taken some harmful thing into our stomachs, to make us throw it up. Do not be content with that, but make the patient vomit again. The easiest way to do that is to get him to open his mouth wide and then to tickle the back of his throat with a feather or a straw. Of the emetics (substances that cause vomiting) the commonest is a large quantity of lukewarm water—a quart is none too much for a grown person. Soap suds is excellent—make it out of laundry soap and warm water and give a glassful.

Another is a teaspoonful of mustard in a glass of warm water. If you have reason to think that there is more of the poison still in the stomach give the patient a good drink of water and then make him vomit again; this is almost as effective as washing out his stomach with a tube.



But when you have finished with this you have done only half the trick. Remember that the inside of the stomach is a mucous membrane—a soft, moist surface, and that a good deal of the poison will stick there in spite of all the washing you can give it. You must give an antidote to counteract that remaining poison.

In the back of a diary you will probably find a list of poisons and their antidotes. Notice that

there is a different antidote for almost every poison. Don't try to remember all of them; even doctors don't attempt that. Fortunately, milk and eggs or a gruel of milk and flour is an excellent first aid antidote for almost all the poisons; but the giving of it does not excuse you from calling a doctor as soon as you can.

Another thing that must be watched is the general condition of the patient. Shock follows very often both from the effect of the poisons and from the great pain that some of them cause. You must treat this, also.

What Two Scouts Did

Malcolm Flagg and Fred Derry, on their way to join their patrol, which was camping at Crystal Lake, came upon a man who had intentionally poisoned himself. He lay beside the road groaning and near him was a blue bottle with the word "Poison" stamped in the glass. He already regretted his act and when the boys bent over him he begged them to bring help. Malcolm spent a few seconds in trying to find out what the man had taken, but the fellow did not seem to be capable of telling. So Malcolm, who was a first-class scout, wasted no more time in that, but thrust the bottle into Fred's hand and told him to run to a house that they had

passed half a mile back and telephone for a doctor. As Fred dashed up the road Malcolm opened his knapsack and took out a cake of soap; then he rushed down to a brook that flowed through the woods on the other side of the road, and presently he was giving the poisoned man a cupful of very soapy water. That had the desired effect. After the fellow had vomited twice Malcolm wrapped him in the blanket that he was carrying to camp. Then he mixed some of the pancake flour from his provision bag with some water and gave a pint of the gruel to the man.

Ten minutes later Fred and a doctor came speeding up in an automobile and after a quick examination the doctor turned to the two scouts and said: "It was lucky that you chaps happened along. This fellow's going to be all right, but he wouldn't have had much chance if you hadn't known just what to do."

That was good scouting. If you would do as well some time remember these things: when you find a person who has taken poison, first spend a few seconds trying to discover what the poison is; second, send for a doctor, telling him if you can what poison has been taken; third, make the patient vomit and at the same time keep him warm and look for shock; fourth, when he has emptied his stomach well, and if you do not yet know what

poison he has taken, give him three eggs beaten up in a pint of milk, or a pint of milk-and-flour gruel. Then let him rest till the doctor comes and stimulate him if necessary.

There are a few special antidotes that are easy to remember. White patches around and in the mouth are usually the result of burning with either strong acids or strong alkalies. There is no way of telling the difference between them that will hold good in every case. If the bottle or package from which the poison came is not labeled, you may perhaps judge which it is by remembering that the patches burned with acids are likely to be hard and dry, and those burned with alkalies are usually soft and rather slimy. If you suspect an acid, give an alkali as an antidote—such as two or three teaspoonfuls of baking soda, or a glass of lime water—*not lime juice;* remember that there is lime in plaster, and if nothing else is handy, crush a small piece of plaster from the wall and mix it with the water; your last choice would be a teaspoonful of wood ashes in water.

If you suspect an alkali, you must give an acid as an antidote—such as vinegar or lemon juice.

Carbolic acid, or phenol, is not really an acid, and does not behave like one. It burns like an alkali and leaves its smell strongly on the breath.

The antidote is dilute alcohol and the eggs and milk as above. Sylpho-nathol (formerly called sulpho-naphthol) is sometimes taken by people; it makes them thoroughly sick, but is only mildly dangerous and needs only the usual treatment.

Tablets of bichloride of mercury (or corrosive sublimate, called also "antiseptic tablets"), are sometimes taken by people who try to kill themselves. The treatment is to induce vomiting and to give milk and eggs, as described above; but other effects of the poison may come on several days or a week later, so that a doctor ought to see the patient every day for at least a week.

Compounds of arsenic are much used for killing vermin. Paris green and Rough on Rats contain much of it. Your treatment will be the general treatment above, for the special antidote is a certain uncommon chemical. However, the dirty liquid obtained by boiling a double handful of rusty nails or other rusty iron in a pint or more of water for fifteen minutes may help a good deal as an antidote and should be given.

Another Kind of Poisoning

All those poisons that we have been speaking about show effects immediately after a person has swallowed them; but there are other kinds

of poisons that show effects later. These are the poisons in food. Sometimes the food has spoiled and so has become poisonous, as in the case of decayed fish or meat; sometimes it contained poisonous substances even when fresh, as in many of the mushrooms and mussels. Some persons are poisoned by certain articles of food, though the food may be harmless to others.

At any rate, if a person begins to have a severe stomach ache from half an hour to two or three hours after he has eaten, and rapidly becomes more ill, with vomiting and diarrhea and headache, you may be fairly sure that what he ate is disagreeing with him; or you may say, if you like, that his food has poisoned him. It is what is called "ptomaine poisoning."

In a case like that the poisonous substance, whatever it may be, has got beyond his stomach and into his intestines. If the patient has vomited several times his stomach is probably pretty empty, so that you needn't worry about that. It is quite likely, too, that he will not be able to keep milk and eggs on his stomach. The thing to do now is to get the irritating substances out of his intestines. Do this with a dose of Epsom salts—four level teaspoonfuls for children and eight level teaspoonfuls for grown-ups, dissolved in a *full* glass or more of water; or give one or two Seidlitz powders.

That will hurry the enemy out of the body and lessen its chances of doing harm.

Sometimes the vomiting is so continuous that even the salts are thrown up. In that case try giving the patient cracked ice to eat; often that will stop the vomiting till the salts can work.

SUMMARY

Treatment for poisons that show immediate effects, such as pain in mouth, throat or stomach (upper third of abdomen) or burned or discolored patches in mouth or throat:

1 Send for doctor, telling him if possible what the poison is.

2 Empty the patient's stomach by inducing him to vomit one or more times.

Cause vomiting by:

a. Tickling throat.

b. Giving large amounts of lukewarm water, or

c. Strong soap suds, or

d. One teaspoonful mustard in a glass of warm water.

3 Give antidote. Best general antidote is three eggs beaten in a pint of milk, or a pint of milk-and-flour gruel.

4 Watch for shock and treat it with warmth

and stimulation (blankets, heaters, aromatic spirits of ammonia, ½ teaspoonful in a little water).

Treatment for poisons (usually in food) that show effects half an hour to two or three hours after eating, such as severe cramp-like pains all over the abdomen, vomiting, diarrhea, headache, shock:

1 Send for doctor, telling what has been eaten.
2 Cause vomiting as above, if patient has not already vomited.
3 Give antidotes as above, plus one to two heaping tablespoonfuls of Epsom salts in a full glass of water, or one or two Seidlitz powders, followed by more water.
4 Watch for shock and treat it.

CHAPTER X

BANDAGES AND CARRIES

THE postman recently brought us a letter from a scoutmaster whose troop has lately become famous for its good work in bandaging. We had written to him for advice, asking what his method of instruction was. Here is his letter:

Dear Sirs:—

In reply to your recent letter asking how I teach bandaging to my troop, I want to tell you an experience that we had last May.

With twenty-four members of my troop and one assistant scoutmaster I was on a camping trip in the Black Hills. We had planned to follow what was said to be an old Indian trail and camp each day at the first good place we could find when the sun began to sink.

On a Tuesday morning we started rather late to go through Calico Pass and down into the valley of Beaver Stream. Early in the afternoon we had reached the point of highest altitude—thirty-five hundred feet according to our maps—when

clouds swept down upon us and brought a cold rain that presently turned to sleet. We hurried along the trail in single file with heads bent low to the storm and in the course of half an hour descended below the tree-line and entered a scraggy growth of spruce. Still it rained, and we were facing the unpleasant prospect of pitching our pup-tents on the wet ground, when suddenly we rounded a ledge and came upon a log cabin half hidden in a dense growth of hemlocks. One of the boys gave a shout and we all rushed forward. The door was latched, but opened readily when we pushed on the handle. Inside we found one long room with bunks ranged along the log walls, and a wide stone fireplace at the further end. Two windows—one in the middle of each long side—gave sufficient light to reveal that the place was unoccupied and apparently had been in that condition for some time. We could not have asked for finer shelter from the storm and with light hearts we set about the pleasant task of making ourselves comfortable. Soon we had a fire going and had cooked an appetizing meal of soup and rice.

We had finished eating and the twenty-six of us were sitting near the fire listening to the beating of the rain and the soughing of the wind when the unexpected happened. I had taken out our first-aid kit and was cleaning a knife cut on Leon

Stewart's thumb when we were all somewhat startled to hear the sound of footsteps and a thump at the door of the cabin. As we turned, the door swung open and into the light of our candles and of our fireplace blaze stepped one of the largest men that I have ever seen. He actually had to stoop as he crossed the threshold. Rubber boots were on his feet and he carried a fishing rod.

"Well, well!" he cried. "What's all this?"

I stepped forward immediately, explained who we were and how we happened to be in the mountains and invited him to have some supper.

"We're both in the same boat," said our visitor; "I've been fishing in Beaver Stream and got caught by the storm too. No, I don't want anything to eat, thanks. I had some supper in my pack, and ate it coming up the trail. But I'll spend the night with you. This old cabin used to belong to a club of sportsmen who came up here every year, but they don't come any more and we're welcome to use it all right. What's that?"

The fisherman pointed to our first-aid kit, and I lifted it from the floor and put it in his hands.

"So you're boy scouts, are you?" he said as he took a roller bandage from the box. "Do you know how to use all these things? I've heard that scouts are pretty clever."

"Well," said I, "we don't know as much about

bandaging as we wish we did; we need someone to show us more about it."

At that a strange twinkle came into the eyes of our fisherman visitor. "Perhaps I can help you a little," he said.

"You might bandage up this boy's thumb," I said, pointing to Leon.

"Come here, son," said the big man, and almost before we had time to see what he was doing he had deftly and neatly bandaged Leon's hand. His fingers moved with almost incredible swiftness and I realized instantly that our visitor was a doctor and an expert with bandages.

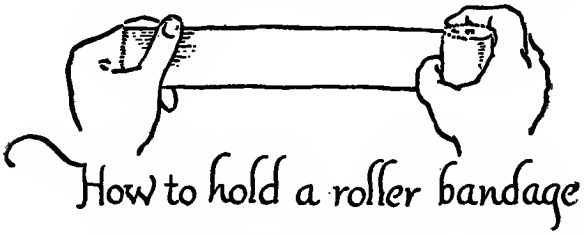
"You must give us a demonstration," I said, and all of the boys crowded round and cried, "Yes, show us how you do it."

"All right," said he, "but first let me take off my rubber boots; they're too hot in here."

A moment later he stood in his stocking feet, a mountain of a man, holding up a roller bandage.

"The main business of this is to go on over dressings and hold them in place. Of course you must never put it next to a wound except when it is sterilized or made of very clean cloth. A roller also makes a good tourniquet, and by putting it round a boy's neck and under his forearm you can use it as a sling, but the triangular is better at that.

"When you buy roller bandages in the stores they are usually gauze, and sterilized, too. That's why you *can* use them without a dressing if you have to and if you are careful not to touch the part that goes next to the wound. Of course, you can make them at home out of clean cotton cloth. Usually they are about ten yards long and



How to hold a roller bandage

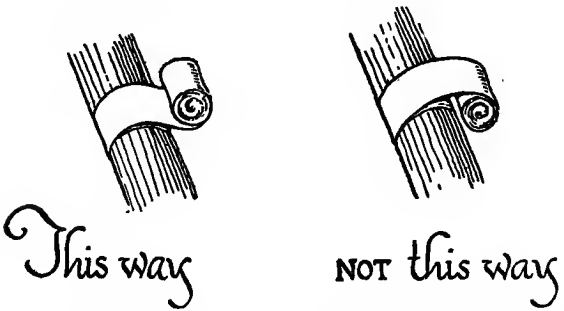
one inch to six inches wide—three inches is most useful.

"First of all you must learn to hold the roller like this, so that you can either squeeze it and pull it tight or let it go loose enough to unroll in your hand."

The big man held the bandage up for all of us to see.

"Then," he went on, "you must always stand directly in front of whatever you are going to bandage, and not to one side of it; and if you are right-handed the bandage always goes from left to right across the top of the hand or foot. You

anchor it by taking several straight turns round the limb; and when you are through you either double it back on itself (see figure on page 124) to make two ends to tie, or else split it down the middle for a way, knot it to prevent raveling and tie the two ends round the limb. Sometimes you hold the end in place with a bit of adhesive tape—what



we doctors call surgeons' plaster. That makes the bandage look neat.

"And now you've got to promise me one thing before I show you anything more. You must never put the roller on backside to. Always make it face out, *always,* with this one exception—when you're using the spiral reverse bandage, which I'll show you presently. But before I do that let me show you the circular—the easiest of the roller tricks.

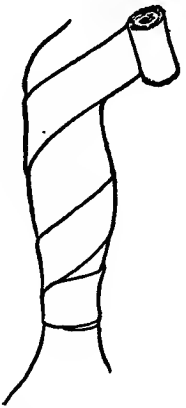
Circular

"Just wind it round and round; that's all there is to it, wherever the arm or leg is the same size for a little way—ankle, wrist, upper arm, neck and head. But just as soon as you put it where the arm or the leg is growing smaller or bigger—like the calf, forearm, thigh, and instep—that doesn't work. A bandage can't hold on well unless both its edges are flat on the skin. If you try to put it on from ankle to knee, for instance, with plain circular turns, you will soon find out that its lower edges are loose. Once when I was stopping at a village forty miles down the valley I was called to fix up a young man who had fallen against a mowing machine. Someone had got hold of a roller bandage and had wound it round his leg from ankle to knee; it was all in loops and bunches.

Spiral Reverse

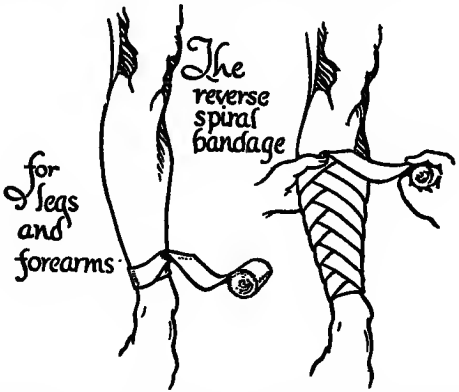
"How do you prevent that? Watch!" The big man beckoned to one of the boys who had taken his puttees and stockings off and began to put the bandage on his leg. "This is one of Mr. Roller Bandage's prettiest tricks and rather hard to learn," he said. "You will have to pay very close attention.

"If you should start in at the ankle and bandage upward with circular turns, always keeping the cloth flat on the skin, you would make a very poor job of it and leave a lot of the calf uncovered. The *reverse spiral* or *spiral reverse* trick stops that. When the circular turns begin to separate rapidly,



stop winding. Put your left thumb on the lower edge of the last turn, to hold it there, and slacken the part between your two hands. Turn your right hand over toward you, so that the top edge of the bandage is now the bottom edge, and the inside becomes the outside. Move your right hand a little toward you and then down toward the foot, always keeping the bandage slack, until the fold lies just above your left thumb. Catch it there with

your thumb. Make the next turn round the leg, keeping the lower edge always the same distance from the last lower edge: that keeps the bandage even. Continue that all the way up to just below the knee. Every other turn the bandage is wrong side out, but it doesn't make any difference, for it comes



out all right. Isn't that a great trick? Here, two or three of you fellows try it."

He took a handful of bandages from the first-aid kit and tossed them to the boys, who were now watching his every move as if he were a conjurer about to produce rabbits out of a hat.

"Notice that the folds where the reverses come are all on the outside of the leg, and not over the shin bone; a row of folds over the bone would hurt after a while."

"But what do you do when you get to the knee?" asked Andy McLoren, one of my patrol leaders.

Figure of Eight

"Figure of eight," said the doctor. "Nearly always use it when you go round a right-angled corner, like the heel or the bent elbow; or across a joint that may need to be used a little after the bandage is in place. It's called that because when

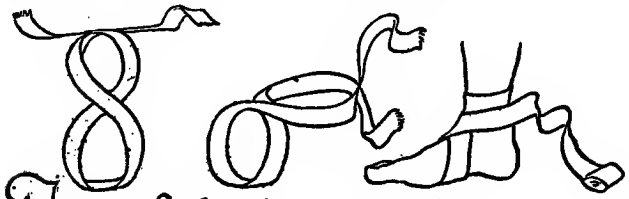


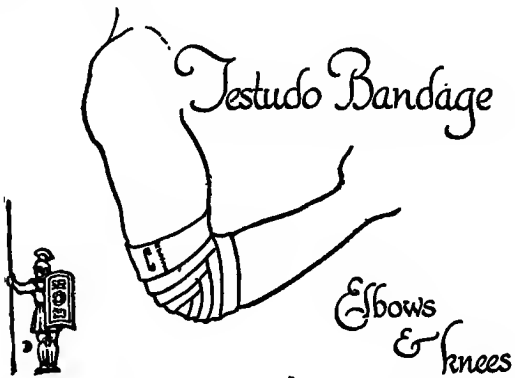
Figure 8 bandage for foot

you use it you make first the upper loop and then the lower, always crossing in the same place. If you can imagine taking a figure eight and bending it in the middle, you'll see what I mean. At the ankle, for example, you take several turns round the smallest part of the leg, bring the bandage across the instep, make the second turn round the foot, cross the instep again, round the ankle, and so on, till you have finished, leaving the heel uncovered. The same at the knee. When you have carried the

spiral reverse bandage to a point a little below the joint, take a turn just above the kneecap, then one just below, crossing the bandage behind the knee. Continue this, letting each turn above the knee go a little higher, and each one below a little lower, until everything below the joint is covered in. Then continue up the thigh with another series of reverse spirals."

Testudo

"But suppose I fall down and skin the *tip* of my elbow; isn't there some way of putting a bandage on it?" I asked.



"Of course there is," said our visitor. "When you get to the elbow or the heel (and, by the way, the elbow should always be bent at right angles when you do it up), put one turn of the bandage

directly over the point; the next turn goes so that two-thirds of its width is above the point, and the next the same distance below. The next is clear of the point and a little above it, and the next is similarly placed below it. Each new turn creeps a little away from the point of the joint, and now you find it is going on like a figure of eight. When you have finished, the whole joint is covered in. That trick is called the *testudo.* If you don't know what that means, look at the picture of a testudo in the dictionary."

"Seems to me I used to read about them in Cæsar, when I was in the high school," said I. "Didn't the Roman soldiers make a testudo by standing one behind the other and lapping their shields over their heads, so that arrows couldn't get through that iron roof?"

"That's it exactly: the turns lap over each other just like the shields. Now here's another bandage that has a Latin name—the recurrent.

Recurrent

"When you want to cover in the toes or the fingers, or one finger, or the top of the head, you lay the bandage back and forth across the part until it is all covered in and then keep it in place with a few circular turns. You will probably have to pin it too.

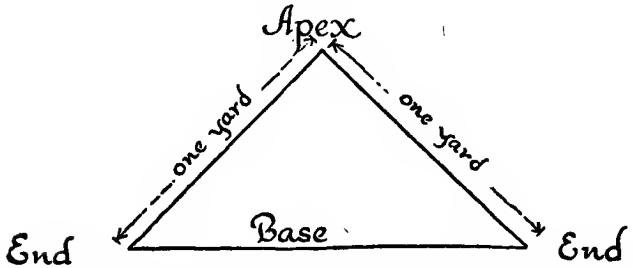
Spica

"Then there's the spica—a word that means a spike or ear. The turns of this bandage resemble the arrangement of the husks on an ear of corn, but it's really nothing more than a figure of eight with one turn bigger than the other. It's used high up on the thigh and for the shoulder. One turn goes round the thigh or the arm and the next round the waist or the trunk, *under* the other arm.

Triangular

"Those are all the roller bandages that you'll have any use for. Let's take a look now at this."

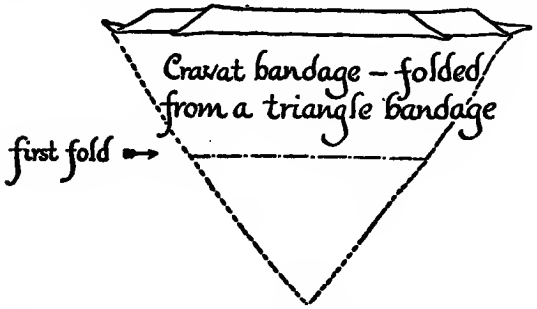
As the doctor spoke he pulled a tringular band-



age out of the kit and held it up for all of us to see. Of course we had seen triangular bandages before, but somehow this one which the big fisherman-doctor held up in the flickering light that

illumined our log cabin shelter looked more interesting than any triangular bandage had ever looked before.

"The main advantage of this over the roller is that you can find it anywhere. Take a piece of cloth a yard square, fold it diagonally and cut it down the crease. That makes two of them. You can make them out of a shirt, or a skirt, or a sheet,



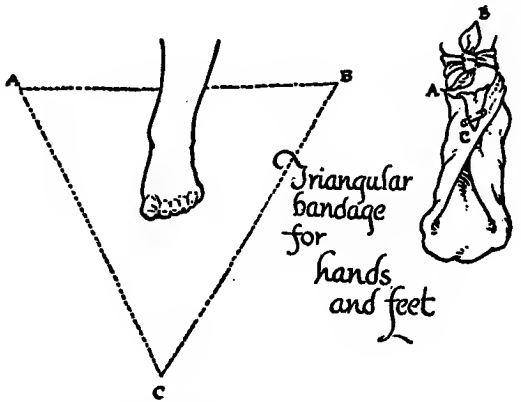
or even a piece of paper. And you can use them either open, like this, or folded into a *cravat* which you can use like a short piece of a roller. For example: round an ankle or a wrist, or over an eye, or for the palm of the hand. The long edge is the *base*, the point opposite is the *apex*, and the other two points are the *ends*."

We were getting more and more interested and at this moment Mr. Simmons, my assistant scoutmaster, suggested that the doctor show us the

best ways of covering different parts of the body.

"Well," said he, "let's have a volunteer 'injured man.' Who wants to be bandaged?"

At his words half a dozen of the boys sprang



forward. He chose Reddy Lane. "Step over here by the fire where it's warm and strip down to your running pants," he said, and Reddy began throwing off his clothes as if he were racing to be "first in" at the swimming pool.

Head

The doctor took the triangular, and laying the middle of its base on Lane's forehead, drew the apex back over his hair and the two points straight back just above his ears. I found when I tried

it afterward that if I crooked my fingers round the ends and held them tight I could keep the whole base tight round the head (this is the important thing) and have my thumbs and other fingers free to fold in the apex over the back of the head. The doctor tied the points together over the apex with

Triangular bandage for head

half a square knot. Then he pulled the apex down to tighten the whole bandage and carried it up over the half knot, with the result that, when he finished the knot, the apex was firmly held between the two halves of the square knot. I noticed that Ted Harris, who had won our competition in knot tying, was watching the doctor keenly when he tied that knot, but he didn't catch him making a granny.

Single Melon

Next the big man showed us a very pretty trick. He called it the *single melon.* He began at the mid-

dle of Reddy's forehead, low down, and went straight back over the top of his head to below the bump on the back of it; then forward, going a *little* to one side, but being very careful to come

to the same point on the forehead; back again, going to the other side. Each time he went a little farther from the middle, but always came to the same points back and front. Soon his layers reached the ears, when he took a few turns round the head, pinned the points where the layers reversed, and said, "This is really nothing except a recurrent bandage.

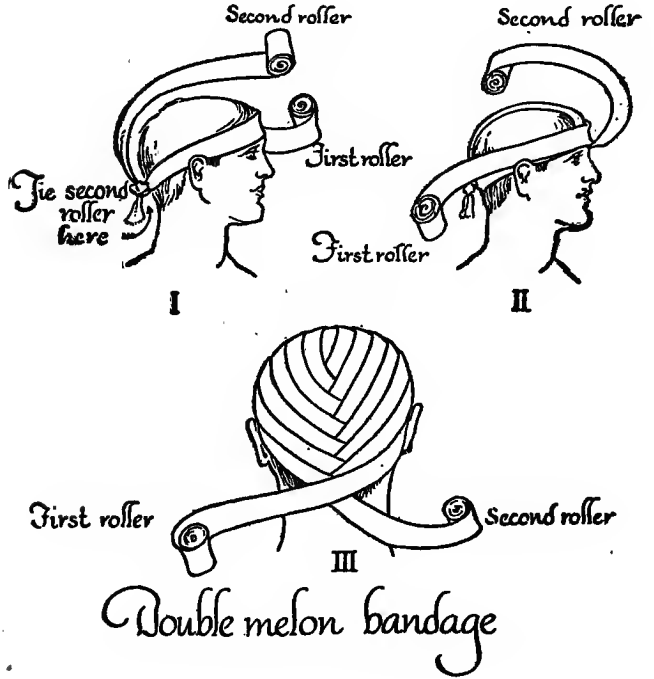
Double Melon

"But the *double melon,* which needs two bandages, is better," he added when he had unwound the roller.

"The last time I used this," he said, "I put it on the head of a boy who had got six inches of his scalp laid open when an ax flew out of the hands of one of his friends who was cutting down a tree.

"One goes round and round, the other is recurrent. After a few turns of No. 1, No. 2 is tied to it in the middle of the back and goes straight forward over the top of the head. No. 1 goes forward round the head just above the ear and crosses on top of No. 2 on the forehead. No. 2 then folds backward, being held in place by No. 1. Keep on till the whole head is covered. No pins are needed here and the bandage, if properly put on, will not come off. It is really a single melon (represented

by No. 2) held on by circular turns (represented by No. 1)."

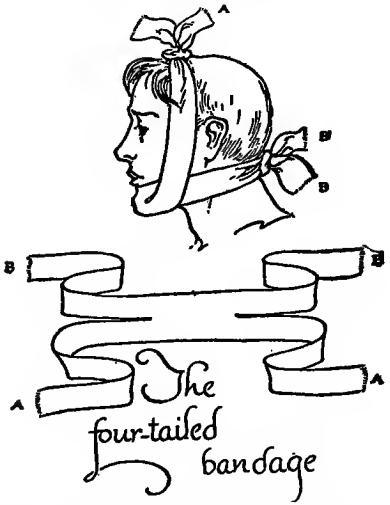


Eye or Ear

He folded the triangular into a cravat and, covering one eye or ear, tied the bandage round the head. With the roller he then did the same thing.

Jaw

"For the jaw," said the doctor, "the four-tailed bandage is the best." He drew us a picture of it

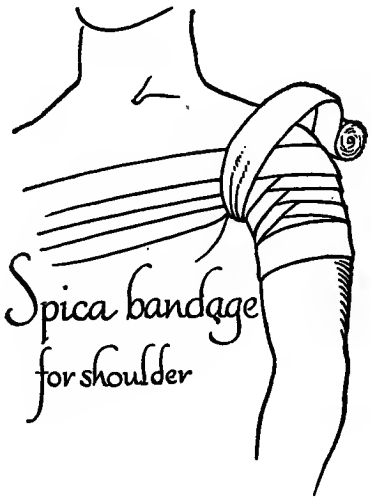


on a leaf of a note book and while the boys were passing it round he showed that two cravat bandages or two pieces of roller would do as well.

Shoulder

For this part of Reddy's anatomy he used the spica. He took several circular turns round the

middle of the upper arm and then began to climb. After each turn about the arm he now took a big turn about the body, going under the other arm. When the shoulder was covered in he tied his ends round the arm.



With the triangular he then bandaged Reddy's other shoulder. He laid his base over the shoulder and across the chest and back so that the apex hung in front of the armpit, tied the ends under the other arm, and, carrying the apex backward under the shoulder, tied it to one of the ends that he had left long for that purpose.

Elbow

"Now for the elbow. Remember that it should always be bent so that the lower arm is horizontal —unless it is dislocated." First he put a figure of eight and then a testudo over it, and then showed us that you can do it just as well with the triangular.

He adjusted it so that the middle of its base

was at the middle of the upper arm and its apex hung straight down behind the elbow. He crossed the ends in front of the upper arm, then included the lower arm between them and tied them, with the apex brought round the point of the elbow and held under the knot. [In the sketch the apex has not yet been brought up under the final knot.]

Forearm

Here the doctor again showed us his *spiral reverse* trick, after he had taken a few circular turns round the wrist for an anchor. He finished with more circular turns just below the elbow.

Palm of Hand

"Don't forget," said the doctor, as he lifted one of Reddy's hands, "that all hand bandages should be finished round the wrist, in order to hold them on surely." Then, putting the middle of a triangular, folded into a cravat, across Reddy's palm, he crossed it on the *back* of the hand, and finished by tying the ends round the wrist. With the roller he did the same for the other hand.

Whole Hand

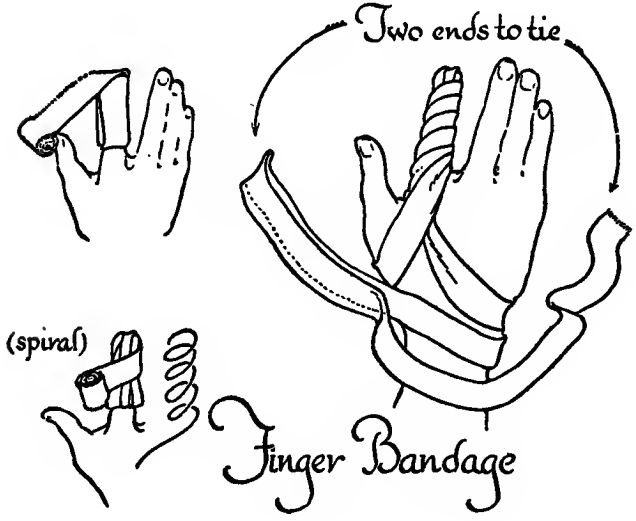
I was interested in this, for often men get their hands torn badly in machinery. He untied the triangular from Reddy's hand and spread it out on a box that stood near the fireplace; at his direction Reddy laid his hand, palm down, on it so that his finger tips reached halfway to the apex. The doctor then folded the apex over Reddy's hand, brought the ends up, crossed them over the back of the hand and tied them round the wrist.

With the roller he then did it differently. He

used the recurrent trick. Beginning on the palm near the wrist, he folded it back and forth over the ends of the fingers to the corresponding point on the back of the hand, laying the turns to right and left until all the fingers were covered. Then with circular turns he covered the whole hand in, beginning at the finger tips and finishing round the wrist.

Fingers

He used the same method here, but he hunted round in our kit until he found an inch-wide bandage. Over the back and the front of the whole



length of the finger he put a recurrent, and held it on with circular turns. At last he went down the back of the hand to the wrist, took a circular turn about it, came back to the finger across the back of the hand, took a few more turns about the finger and finished round the wrist. "If I went to the wrist across the palm," he said, "every time you bent your fingers the bandage would loosen."

Groin and Thigh

"Here you use the spica. Round the thigh, round the waist, a little higher round the thigh, round the waist again and so on. That's all. The triangular for the groin goes on like a diaper; for the thigh tie the ends round the thigh and pin the apex to your patient's belt. It isn't tight enough for him to walk much with it on, but it'll hold a dressing in place while he lies down."

Leg, Knee, Foot, Toes, Sprained Ankle

"There isn't much more," said the doctor as he saw one of the boys yawn, "and there isn't much of Reddy that isn't covered. Bandage the leg just as you do the forearm; foot and toes like hand and fingers. Knee like elbow; ankle, too, except for one thing. That's sprained ankle. Your

ankle usually turns out when you sprain it—or your foot turns in. That stretches the tendons and ligaments on the outside of your ankle and foot. The bandage must strengthen these and goes on in a special manner. Use the figure of eight applied so that it crosses under the sole from big toe side to little toe side. As it comes up over the instep, pull up hard, bending the foot out, so that the strained tendons and ligaments are slackened and their place taken by the tight bandage. Anchor the turn round the ankle, and repeat. You will find that the ankle is much relieved."

"One more question," I begged. "What about a sling? We know how to do it after a fashion but perhaps you know a better way."

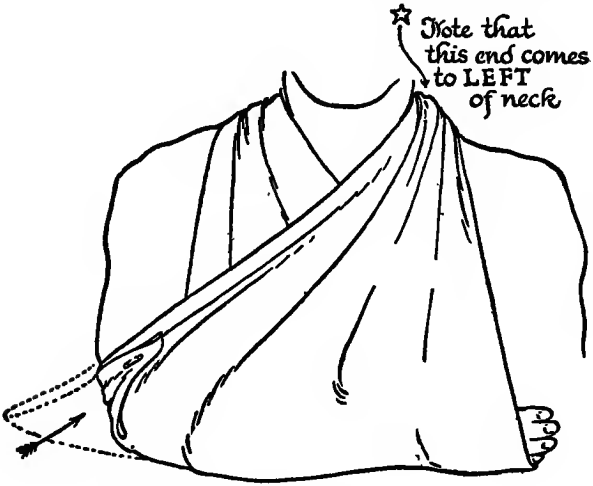
Sling

"Lay the triangular flat," said the doctor; "put your elbow on the apex and your fingers at the middle of the base; tie the points round your neck with your forearm held horizontal. Be sure to have it support your whole hand. Then fold the apex over your elbow in such a way as to support it a little, and pin it there.

"If you want to use the roller for a sling, make a sort of figure of eight. Take a loop round your wrist, go round your neck, another loop round your forearm near the elbow, round your neck

again, and so on till you have support enough for the arm.

"As for a tourniquet, use the triangular as a cravat with a stick or use several lengths of the



Sling for arm

roller. There, boys, that's pretty near all I know about bandages."

"Well, sir," said I, "I can't tell you how much you have done for me and my troop tonight. For a long time we've been anxious to learn just the things you've shown us."

"You're welcome!" said the doctor. "And now I guess it's about time we turned in. Well, I should say so!" he exclaimed as he pulled out his watch. Much to our surprise it was eleven o'clock.

The whole evening made a great impression on us. We rolled up in our blankets and slept soundly in our snug shelter. Next morning when we woke the storm had passed and the sun was shining. The doctor ate breakfast with us and then we said good-by, for he was going back to his fishing. We never saw him again, but none of us will ever forget that night in the log cabin with the rain beating down on our shelter and that mountain of a man standing in his stocking feet and by the wavering light of candles and fireplace putting bandages all over Reddy Lane. The troop has taken a tremendous interest in bandaging since our trip over the old Indian trail to Calico Pass.

So there you are.

Sincerely,

H—— S. A——.

A fine letter. Worth quoting—every word. In addition remember these things:

A bandage should be snug, not tight. If you put it on a leg or an arm, look at the fingers or toes in an hour. If they are pink and warm the

bandage is not too tight; if they are colorless and cold loosen the bandage immediately. Watch carefully, especially if the bandage is put on soon after an injury. The part may swell much and choke itself against the bandage.

Never use a bandage wet; it will shrink and become tight as it dries.

Use too much bandage rather than too little.

LIFTS AND CARRIES

After you have been first aider to your injured friend you may have to be legs for him too. If you are alone with someone who has fainted or who is unconscious and wish to move him a short distance—say across the room to a window—or to lift him from floor to bed, the best method is what may be called

The Transfer Lift

Put one arm under the patient's knees, the other under his neck and under his farther arm. Before you lift, double the patient till you can grip your two hands together; in this position he is like a huge ball in your arms, through which he cannot slip until you loosen your hands. Most important of all, his head is supported by your arm and cannot hang limply backward.

You cannot carry anyone far in this way. If that is necessary, use

The Fireman's Lift

This is a maneuver for getting an unconscious person securely on your shoulders. Turn the patient on his face. Straddle him, facing toward his

head. Stoop, and with your arms round his chest, lift him to his knees; then, with arms shifted to his abdomen, raise him to his feet. Grasp his left

wrist with your left hand and draw his left arm round your neck, stepping meanwhile to his left side and supporting him with your right arm round his waist. Next, grasp his right wrist with your

left hand and draw his right arm round your neck, letting his left arm go and bending in front of him, so that now his head and chest lie across your shoulders. Pass your right arm between his legs and round his right thigh. Lift, and settle him comfortably on your shoulders. Finally, shift his right wrist to your right hand, and with your left hand grasp his left wrist.

If your patient is not too heavy, you can carry him in this position for some distance, or even up or down a ladder. If necessary, free your left hand and use it.

The Four-Hand Chair Carry

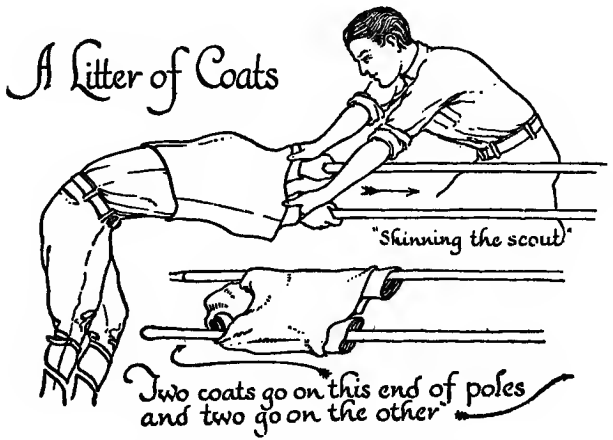
When there are two of you to help and the patient is not unconscious the four hand chair carry

Four-hand Chair

does fairly well for short distances. Connect your four hands as the illustration shows, seat the patient on them and have him put his arms round your necks for balance.

The Litter

The word means "a bed." Anything on which a person may be laid and carried about is a litter. You must use one when a patient has a serious wound or a fracture, or must be carried far.



A window blind, an ironing board, a table leaf, a short ladder well padded, a mattress and so forth may be used when a regulation litter is not to be found.

The coat litter is a good substitute. It is made of two poles six or seven feet long and two—better four—coats. Have the wearers of the two coats take the ends of the poles in their hands and bend forward till their backs, arms and the poles are in a horizontal straight line. Take hold of the bottom of their buttoned coats and peel them off, inside out, over the wearers' heads until you reach the sleeves. Slip the coat-collars over the wearers' heads, catch the sleeves at the wrist, and complete the business with one pull. Add another pair of coats and the litter is finished.

Whatever kind of litter you have, lift the patient onto it gently; *be sure that his head, arms and feet do not hang over the edge;* carry him feet first except when going up hill; and to avoid jouncing him, break your step.

CHAPTER XI

FRACTURES AND DISLOCATIONS

PROBABLY not more than half of us grow to scout age without breaking a bone. It is usually not a serious accident. We remember a few hours of pain followed by a few weeks of keeping the bone still, and then we were as good as new. But some of us have stiff elbows or crooked fingers, and know that a broken bone is not a joke. And we well remember how glad we were, before the doctor came, to have someone take care of us who knew what he was doing. It is decidedly worth while to learn something about fractures and dislocations.

Kinds of Fractures

A fracture is nothing more or less than a broken bone. There are four important kinds. A fracture is *simple* when the bone is broken but does not pierce the skin. It is *compound* when one or both of the fragments are pushed out through the skin, making an open wound. Sometimes the two fragments are jammed together end to end so hard that they stick there; this is an *impacted* fracture.

And last, the fracture is said to be *comminuted* if the bone has been crushed into several or many pieces by a heavy weight, such as a tree or a street car.

To Determine a Fracture

When you find a person who has fallen or has been struck or has wrenched his arm or leg violently, you must do your best, of course, to find out whether or not his bones are broken. If he has suffered a compound fracture you will be able to see the bone and can be sure of the diagnosis; but if the fracture is simple you must look for these signs:

1 Pain. You will find your patient complaining of pain in *one* spot.

2 Disability. He will tell you that he cannot use the injured limb properly, although he may be able to move it a little.

3 Deformity. Often the painful member is different in appearance from the member on the opposite side. Always compare the bad side with the good one, both by sight and by touch.

4 Tenderness. Feel of the injured part. Unless there are bruises, a broken leg or arm will not be tender except directly round the point of fracture. Doctors speak of this as *localized tenderness.*

5 Extra Motion. Grasp the limb above and be-

low the tender place, taking great care to be gentle, and watching your patient's face to see when you hurt him. Try, slowly and carefully, to bend the limb at this point very, very slightly, as if a joint were there. If you can bend it, the bone is fractured. You must use great care in doing this, for fear of injuring the flesh.

6 Crepitus. Last, with your hands in the same position, try gently to rub the broken ends of the bone across each other. If you hear and feel a gritting, which doctors call "crepitus" (a word meaning "crackling"), you may be sure that the bone is broken.

Caution

If the fracture is impacted, Nos. 5 and 6 will be absent, because the broken ends will be wedged forcibly together again. This happens when the patient has fallen straight on an outstretched limb—as, for instance, when he has landed squarely on his feet, or on his outstretched arm. If you suspect that this is the case, treat it like a simple fracture.

What to Do

If you decide that the bone is fractured, the first thing to do is to make your patient comfortable. Lay him down and prop the broken arm or leg in any comfortable position with pillows or coats or

anything that is handy. If the fracture is compound you must take steps to prevent infection; pour tincture of iodine directly into the wound and cover it with a sterile dressing. Bleeding, of course, must be stopped. If you have no antiseptic to kill the germs that are already there, at least use the sterile dressing to keep new ones out.

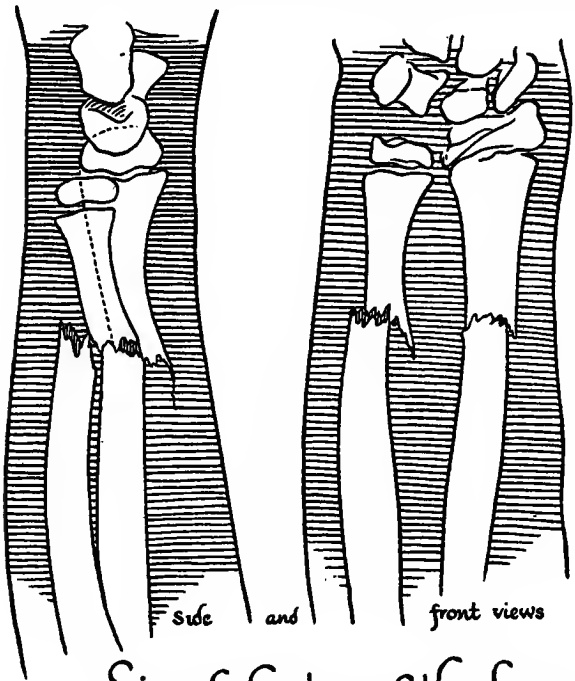
The second thing is to watch for shock; the treatment is warmth and stimulation—blankets and hot black coffee are best.

The third thing is to get a doctor. If one is nearby, let him do all the rest; if not, you must get the patient ready to go or be carried to one.

On the journey he must be comfortable, for repeated or continued pain will exhaust him and bring on shock as surely as sudden severe pain will. Since it is movement of the broken bone that will hurt him, it is plain that you must keep both fragments of the bone quiet, by applying something outside of the limb to stiffen it, in place of the useless bone. Whatever you use for stiffening is called a splint; it may be a long, thin, flat piece of wood, such as doctors use, or several small sticks laid on side by side, or a broom handle, a cane, a rifle, a rolled-up newspaper, a pillow, a piece of bark—anything that will stiffen the dangling limb.

There is another reason for using splints. Look at the figure, which was drawn from an X-ray plate,

and you will see how pointed and sharp the ends of a broken bone may be, and how easily they may



Simple fracture of the forearm

be pushed about, cutting and tearing the soft parts and even pricking through the skin, thus making a compound fracture. A compound fracture is

so much worse than a simple fracture that you must do everything you can to prevent a simple fracture from becoming compound.

The two reasons for using splints, then, are:

1 To prevent needless pain.

2 To prevent injury to the soft parts and the possible development of a compound fracture.

The value of splints is well shown by an accident that happened to a wood chopper in Michigan. A heavy tree fell across his leg, causing a simple fracture of both the bones below the knee. It was winter. He was alone and knew nothing about first aid. With fine courage he began to crawl through the snowy brush to the nearest house, a half mile away. After a long time and many stops he reached the house, but his simple fracture had become compound and he was in deep shock as a result of the pain. He was rushed by sleigh and train to a hospital and had the best of care, but infection had gotten in and later he lost his leg above the knee.

The Best Splint

The ideal splint is a piece of light wood a quarter of an inch or three-eighths of an inch thick. Its width should not be more than three-quarters of the diameter of the limb; if it is narrower, it loses in stiffening power; if wider, it holds the band-

age too much away from the limb. Where the diameter of the limb changes, the width of the splint should change to correspond.

The length should be great enough to include not only the fractured place, but also the joints above and below it. Muscles from farther up and down the limb are attached to the good ends of the broken bone and when they contract, tend very strongly to cause movement of one of the broken ends. Thus, in a fracture of the lower leg you must make the splints include both ankle and knee; in one of the thigh, both knee and hip must be splinted, and so forth.

Padding

Another point of great importance is the padding of the splint. Double one foot under you and sit on a hard floor for a few minutes and you will become painfully aware of the bones in your ankles and knees. Just so with the man who for an hour or longer has to bear a piece of wood tied tightly over any point where a bone comes near the surface. Besides the pain, there is the danger of ulcer formation.

The aim of padding is to fill in the hollows of the outline of a limb with enough of some soft substance to lift the splint away from any bony

prominence and allow it to press with equal firmness all up and down the limb. Intelligent padding will make any splint comfortable. Of course the padding goes between the splint and the flesh.

Although absorbent cotton makes excellent padding, it is seldom at hand when needed. Fairly good substitutes are grass, hay, dry moss, leaves, soft tissue paper, a thin pillow, and so forth. Lack-

ing all else, the patient's own clothes, put carefully back in place, make acceptable padding.

We have gotten far enough now to be able to make general rules for treating fractures with splints.

1 If it is compound, treat the wound at once.

2 Draw the broken limb into as natural a position as you can without hurting your patient too much. Do not try to "set" the bone.

3 Prepare the splints. If the wood is rough wrap it with bandage or other cloth.

4 Prepare padding.

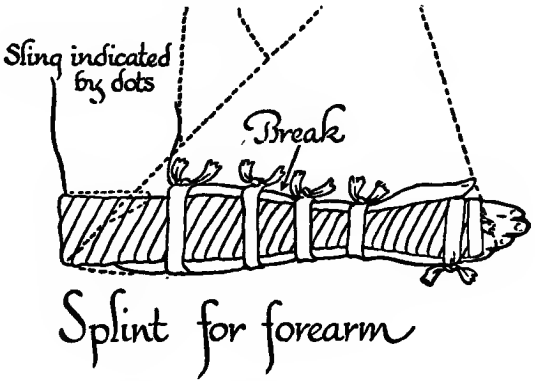
5 Apply padding and splints slowly and carefully, holding them in place at first with small strips of cloth or cord, if alone, or having someone else hold them; and later covering and binding on the whole with bandage. This must be firm, but not tight enough to cause pain or to interfere with circulation. Always leave the ends of the fingers or toes uncovered; if they become cold or numb or blue in an hour or two, the splints are held on too tightly and must be loosened.

If no bandage is handy, hold the splints in place with cord or strips of cloth as follows: one tied about the splints just above the point of fracture, one just below, one at each end of the splints, and as many more as are necessary to hold the splints firmly in place.

With these general principles in mind you are ready to take up special treatment for the common fractures.

Fracture of the Forearm (Radius and Ulna)

In the forearm—the part of the arm between the elbow and the wrist—there are two bones, the radius and the ulna. When one bone only is broken, the other acts as a partial splint; but frequently both bones are fractured.



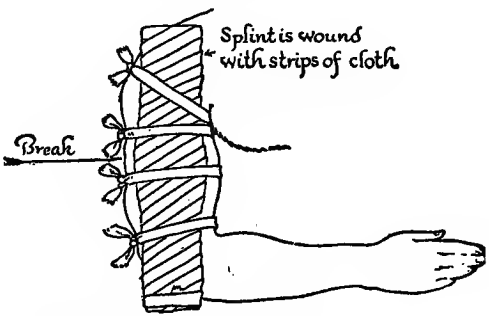
Splint for forearm

Use two splints and a sling. With the patient's elbow bent at a right angle and hand on edge, so that the palm faces the stomach and the thumb points straight up in the air, shape one splint to fit on the palm and the inner side of the arm from the base of the fingers to the bend of the elbow.

Fit the other splint correspondingly on the outside from knuckles to elbow. These two splints keep forearm and wrist quiet; the next step is to immobilize (that is, to keep from moving) the elbow by putting the forearm in a sling. Remember that slings should include hand and fingers.

Upper Arm (Humerus)

Two splints and a sling. Hold the arm as before; one splint goes from armpit (axilla) to elbow; the other from shoulder to elbow. Neither



Splint for upper arm

splint immobilizes either joint (elbow or shoulder). A sling takes care of the elbow and partly of the shoulder. A few turns of bandage round the arm and body will hold the shoulder joint fairly quiet.

Collar Bone (*Clavicle*)

No splints can be used here. Hold the arm bent at the elbow as before. Apply a sling and keep the whole arm close to the body with circular turns of bandage round arm and body (as in fracture of the upper arm). The patient's shirt replaced over the injured side—with the sleeve empty, of course—does very well. Often a soft pad six inches square and three inches thick placed high up in the armpit will help to ease the pain. Hold it in place by a cord run through it and tied round the neck. When the elbow is brought tight to the side the pad tends to throw the shoulder out, and thereby to drag the broken ends of the collar bone somewhat apart.

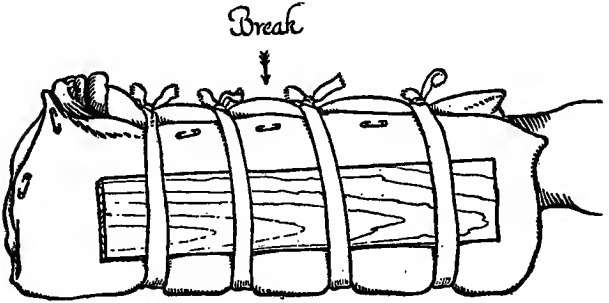
Leg (*Tibia and Fibula*)

Strictly speaking, the thigh extends from the hip to the knee, and the leg from the knee to the ankle.

The leg, like the forearm, contains two bones, which help to splint each other when only one is broken.

Although the joints are larger and the muscles stronger in the leg than in the forearm, so that we might reasonably expect to use heavier splints,

the fact that the patient cannot walk and must be carried means that his leg will be kept fairly quiet merely by his position. We find, therefore, that a pillow does very well as a splint for the leg. It immobilizes the ankle, while the knee is immobilized by keeping the patient flat on his back. Select a rather thin bed pillow, pat it smooth, then crease



Pillow splint for fractured lower leg

it lengthwise in the middle. Let one person lift the leg carefully (with one hand just above the ankle and the other just below the knee), place the pillow in position and lower the leg into the crease. The end of the pillow should project about three inches beyond the heel. Wrap the pillow round the leg, making it snug and smooth, and hold it in place with cord or strips of cloth previously

placed on the ground under the pillow. If you have safety pins, pin the edges of the pillow tightly together; or, if it is too big, lap the edges and pin them.

Last, push upward on the ball of the foot till the sole is at a right angle with the ground and hold it there by pinning the projecting edges round it.

Although the pillow alone will serve in an emergency, it is much better to reënforce it with three splints placed below and on both sides, which reach from knee to sole. Never put a splint on the front of the leg over the shin bone. In that position it is not only painful but is likely to cause an ulcer.

If you have the splints and not the pillow, pad them well and apply as above.

Thigh (*Femur*)

In the thigh is the longest, biggest bone in the body, and some of the strongest muscles. A break here is a painful and serious thing, even if it is a simple fracture. Both knee and hip must be well immobilized.

Use three splints. One goes on the inside of the limb from crotch to ankle; another, of the same length, goes under the limb from buttock to ankle; and the third, on the outside, from the ankle to the *armpit*. This one keeps the thigh from moving

outward; it should be fastened by tying it at the ankle, below and above the knee, below and above the point of fracture, below the hip, and round the body at the waist and chest. The last two should turn once round the splint to prevent it from slipping forward or backward.

Sometimes, when you cannot get good splints, you can save the situation by tying the two legs together so that the good one splints its injured brother.

Fingers

Straighten the finger as much as possible and apply a padded splint from the tip of the finger to the heel of the palm. Sling.

Ribs

Fractured ribs show localized pain and tenderness, and usually great pain on breathing. Crepitus may or may not be found. The fracture is seldom compound, but the sharp broken end may be driven inward and puncture the lung. Pleurisy and pneumonia are often the complications that follow a fracture of the ribs. The only first aid treatment is a tight swathe round the chest. This should be of stout cloth eight or ten inches wide, and pinned tight while the patient's lungs are empty.

Lower Jaw

Here, in addition to the ordinary signs of fracture, look for unevenness in the line of the teeth. Apply the four-tailed bandage as shown in Chapter X (p. 120).

Skull

Fracture of the skull is discussed in Chapter VI, page 63. There is no first aid treatment except quiet and warmth. Get a doctor quickly; delay is dangerous.

DISLOCATIONS

A dislocation is an injury at a joint in which the two bones are pulled or pushed apart and remain out of place. It may be simple or compound, like a fracture. The cause is a violent twist or shove on a bone, such as may occur in slipping or falling against something, kicking, throwing a ball, and so forth.

Diagnosis

1 The surest sign of dislocation is dis=location; something about the joint looks strange—out of place—when you compare it with the corresponding joint of the other limb. Also, it feels different.

2 Of course, if one of the two bones at the

joint is out of place the joint cannot do its work well; that is, you will not be able to move the joint as you should. There is lack of proper motion.

Remember that in fractures motion is usually present where there should be none; while in dislocations proper motion is reduced.

3 Pain is not localized in one spot, as in fractures, but is general—all round the joint.

4 There is no real crepitus. Sometimes a soft rubbing can be felt in a dislocation; but there is none of the sharp, crackling sensation that you get when feeling a fracture.

In addition, swelling generally sets in sooner and is greater than in the case of a fracture.

Sometimes you cannot decide between a dislocation and a fracture, and sometimes the patient may have both or neither. When in doubt, treat like a fracture.

Treatment

Make your patient comfortable. If the dislocation is compound (which rarely happens), treat the wound at once to prevent infection. Put the joint into the most comfortable position for your patient and prevent swelling as far as you can by applying hot or very cold cloths continually over the joint. Get a doctor or get your patient to one.

Except in the cases mentioned below, and then only in an emergency, *never try to replace the bone.* Joints are delicate things, very necessary to our comfort and easily injured. Moreover, the ligaments about the joint have been injured and torn by the dislocation; it is important that the bones be replaced in such a way as not to injure them further. Only a good doctor knows how joints are built and how best to reduce a dislocation.

When You May Try

There are three cases in which you are justified in trying to reduce a dislocation—finger, lower jaw and shoulder; but only when it will be impossible to get a doctor for eight hours or more. The less you bother with dislocations, after you have made your man comfortable, the better first aider you will be.

Fingers

What we now say applies only to the two end joints of the fingers and to the one end joint of the thumb. Dislocations of the knuckles and of the second thumb joint had better be left to the doctor.

Dislocations of the finger and thumb joints are common, especially in baseball. Pull out on the injured finger, keeping the dislocated bone bent

just as it is until it snaps; then straighten it to its usual position and relax the pull. Apply a finger splint and have the patient keep it on for several days.

Lower Jaw

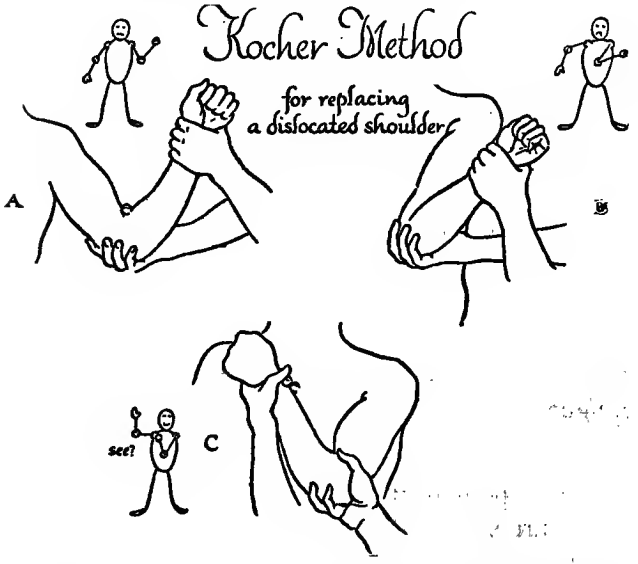
Sometimes the jaw is dislocated on one or both sides by nothing more strenuous than a wide yawn or bite; laughing and vomiting are not unusual causes.

Cover both thumbs with thick cloth and, placing them on the patient's back teeth, with the fingers grasping the jaw outside, press down and back with a strong, steady movement. Just before the jaw slips back, slide your thumbs off from between the jaws, for the teeth come together smartly. For the same reason tell your patient to keep his tongue in.

Shoulder

This is perhaps the commonest of all dislocations. There are several different varieties, named according to the position of the arm bone after it has slipped out of its socket. Reduction is not always easy, even for a doctor; sometimes the patient must be etherized, not on account of the pain, but to relax the spasm of the injured muscles round the joint. For these reasons, do not try to reduce the dislocation except when no other help is near.

If forced to it, proceed thus: stand on the injured side of the patient and grasp wrist and elbow of the dislocated arm. Hold the elbow somewhat away from the body, and without moving it force the wrist backward slowly with a firm pressure



until it is nearly on a level with the shoulder. There will be resistance to this movement, overcome slowly by a long, steady, gentle pressure. This movement should take two to five minutes.[1] Next, with the wrist still held back, bring the elbow somewhat

[1] Cotton, "Dislocations and Joint-Fractures."

across the chest. Third, holding the elbow in its new position, and pushing a little upward on it, swing the wrist across to the opposite shoulder.

This is called the Kocher method and is far better than the old way of putting your heel in the patient's armpit and hauling on his arm.

If you succeed in reducing the dislocation, hold the arm to the side with sling and bandages and keep up hot or cold applications for several hours.

If you fail, after two or three trials, *stop;* for you may injure the joint severely by repeated trials.

CHAPTER XII

DROWNING AND ARTIFICIAL RESPIRATION

WHEN the Beaver and the Blazing Arrow patrols in charge of Scoutmaster Nolan set out for their three-day camping trip at Archer Lake last October no one of course had any idea of the startling accident that was to occur before their first camp fires were lighted. At four o'clock the two patrols arrived at Pine Point, which juts out into the clear waters of Archer Lake, and as soon as the tents were pitched everyone, including the scoutmaster, stripped for a swim.

The day had been unusually warm for October and the cool water was refreshing. Peter D'Arcy, patrol leader of the Beavers, immediately swam out beyond the others; he was a hundred feet from the shore when suddenly he threw up his arms and shouted for help. Raymond Hutton, who was nearest, swam to the rescue, although he was considerably smaller than Peter.

To the scouts on shore and to those in the water who had heard the cry for help and had seen Raymond swim to give aid, it seemed that the two

went out of sight at the instant that the smaller boy fearlessly reached out his hand to the larger. There was a brief struggle and the water closed over their heads. They did not come up.

Scoutmaster Nolan was already swimming toward the spot with hasty overhand strokes, but he turned his head long enough to shout to the boys on shore to run for a boat that they had seen at a landing on the other side of the point. Then he swam on and presently dived below the surface. A few seconds later he came up—empty-handed. Twice more he dived without result and by this time two of the Blazing Arrows were rowing hastily toward him in the little white boat that they had found at the landing. As they came alongside, the scoutmaster seized the stern, climbed aboard and immediately dived. Three times he did the same thing while the two boys in the boat watched white-faced and silent. The third time he came to the surface slowly—dragging something. As soon as his head rose above water he seized the gunwale of the boat and the scouts saw that he was holding with the other hand to the two boys who had sunk. D'Arcy's arms were clutched tightly round Hutton's neck and both were apparently lifeless.

A few seconds later the boat had touched shore and Scoutmaster Nolan was giving sharp orders.

"All of you Beavers get to work building a fire and warming some blankets; Grey (turning to his senior patrol leader), you take Hutton and do exactly what I do to D'Arcy. Sargent, you and Doherty take that boat and row across to the farmhouse, over on the other shore, telephone for a doctor and tell him to bring a pulmotor from Hicksville if he can get one."

While the scoutmaster was speaking he had rapidly felt with his fingers in D'Arcy's mouth to make sure that there was nothing obstructing the passage to his throat and that his tongue was drawn forward. Grey followed his example with Hutton. Next they both lifted the unconscious boys by the hips and for several seconds held them in that position with heads hanging down close to the ground so that the water in their throat and lungs could run out. Once or twice Mr. Nolan gave D'Arcy a vigorous shake and Grey did the same with Hutton.

"Quick now," said the scoutmaster, "put him, stomach down, on the sand—Schaefer method. Two coats folded" (this to some of the Blazing Arrows who were standing and whispering together as they watched).

Almost before he had the words out of his mouth two coats were thrust forward and the scoutmaster and Grey adjusted them under the chests of the

two unconscious scouts so that their faces fell lightly forward and their mouths and noses were free for breathing. Then the scoutmaster stretched out D'Arcy's arms in front of his head and once more made sure that the boy's tongue was pulled forward.

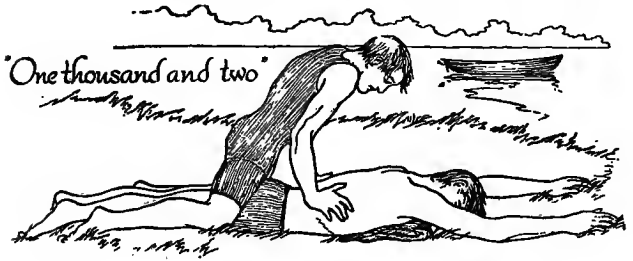
All that had taken less than a minute, for Mr. Nolan and Grey were working with all the speed

"One thousand and one—"

in their power. Now they both kneeled straddling their patients' thighs and, placing their wide-spread hands so that the thumbs nearly met on either side of the backbones and the little fingers lay along the lower ribs of the unconscious boys, began to exert pressure.

"A thousand and one, a thousand and two, a thousand and three, a thousand and four," counted Mr. Nolan. At his first words he was sitting back against the calves of D'Arcy's legs with his hands resting lightly on the boy's lower ribs; but as he

began to count he rose slowly on his knees and pressed more and more strongly with his hands. As he said "a thousand and two" he was exerting full pressure; as he said "a thousand and three" he was relaxing the pressure and settling back to the sitting position; at "a thousand and four" he was back again in his starting position with his hands resting lightly on D'Arcy's lower ribs. Im-



mediately he repeated the movement, again counting "a thousand and one, a thousand and two" and so on. Meanwhile Grey was working in the same manner over Hutton. Each complete movement took about four seconds and the counting was for the purpose of regulating the artificial breathing to fifteen respirations a minute—the normal rate in health. Presently three of the Beavers ran up with warm blankets and it took only a few seconds to adjust them under and round the two boys.

"A couple of you Beavers get some towels and

begin to rub their legs and arms toward the heart, while Grey and I are working," ordered Mr. Nolan, and he saw with satisfaction that the Beavers carried out his command efficiently and without getting in the way. Steadily he went on with his artificial respiration and once when he glanced at Grey and caught a despairing look on the patrol leader's face he said, "Keep it up! We'll win."

Suddenly one of the Blazing Arrows gave a shout and pointed at D'Arcy. "He moved his eyes," he cried.

Scoutmaster Nolan gave a quick glance at D'Arcy's face and went on with his work. The boy was beginning to breathe and presently he moved one of his hands, turned his head a little and spoke. What he said made everyone laugh, though there was a lump in every throat.

"You're breaking my slats! Let me up!"

At that Scoutmaster Nolan leaped over to Grey. "I'll take Hutton," he said. "You get out the first aid kit and give D'Arcy a dose of aromatic spirits of ammonia—half a teaspoonful in some water. Then keep him in the blankets close to the fire where he'll be warm."

When Grey found time to look up from tending D'Arcy he saw that Hutton was moving his feet. A few moments later the scoutmaster was giving Hutton a stimulant too. The boy was still dazed

and he kept repeating as he looked round at the smiling faces of his Beaver and Blazing Arrow friends: "He wouldn't let go of my neck. He wouldn't let go of my neck."

Quarter of an hour later a doctor rowed across to the point with the two Blazing Arrows who had gone to the farmhouse; but he found nothing to do. Hutton and D'Arcy were still feeling weak, but they both were smiling cheerfully and lying in comfort near the fire.

When the doctor left he shook hands with Scoutmaster Nolan and said, "Thanks to you, those boys will be all right. The bigger lad's stomach seems to be a little upset. That's natural, seeing that he had a cramp. I've left some Jamaica ginger: give him one teaspoonful tonight in some hot water. A good sleep tonight will make them both O. K."

We have described this accident in detail because of the fact that the scoutmaster and the boys took exactly the right method and did not "lose their heads."

There are a few points that need special emphasis. As soon as you get the patient to shore always try to rid his throat and lungs of what water there is in them by lifting him with your hands under his hips; and *always take pains to see that his tongue is pulled forward.* Sometimes a drown-

ing person "swallows his tongue" and obstructs his breathing passages. You could work over him for hours without effect if you left him in that condition. Just that little detail of pulling forward the tongue might mean the difference between life and death. In giving a scout his first-class examination in artificial respiration the court-of-honor man ought to mark him zero if he does not remember the tongue. Scoutmaster Nolan used the Schaefer or prone pressure method rather than the Sylvester method because on the whole it has proved to be the more satisfactory; one of the points in its favor is that in the face-downward position the tongue naturally lies forward. Should it seem to be clogged in the patient's throat tie a handkerchief or a shoe-string round it and fasten it so that it cannot be drawn back.

If the unconscious person is partly or wholly clothed, get someone to loosen or remove all tight clothing about the neck, chest and waist while you continue the artificial respiration.

Above all things do not give up trying because there seems to be no life in your patient. An hour, or even two hours, is not too long to continue the artificial respiration, for while a spark of life lingers there is a chance to kindle it into health.

One of the common mistakes in artificial respira-

tion is to apply pressure too rapidly. Normally you breathe about fifteen times a minute—once every four seconds. Counting "a thousand and one, a thousand and two, a thousand and three, a thousand and four" will help you to regulate the pressure, but it is a good plan to time yourself with the second hand of a watch to make sure that you are working at the correct rate.

One Criticism

Only one thing about the accident at Archer Lake can be criticized—Raymond Hutton's method of going to the rescue of his friend. He swam straight toward him and stretched out his hand without stopping to realize that D'Arcy, half crazed with the fear of drowning, would seize him in a frantic grasp. Always approach a drowning person cautiously and, if possible, from behind, so that you can get a firm grip upon him and prevent him from seizing you. Should he succeed in grasping you, do not hesitate to strike him in the face or to double up and thrust him away with a vigorous push of your feet; but do not hit him with anything harder than your fist.

ELECTRIC SHOCK AND GAS ASPHYXIATION

In serious electric shock a person often ceases to breathe. The first-aid treatment is to begin

artificial respiration as soon as you have removed the patient from contact with the current. The importance of this is emphasized in a letter from an insurance company. The writer says: "The physician that was called gave the man up without any attempt at resuscitation. I still think, from what those who were there tell me, that a short time with the prone-pressure method would have brought him around."

The United States Department of the Interior gives some valuable advice about electric shock in a circular entitled "First Aid Instructions for Miners":

The symptoms of electric shock are: Sudden loss of consciousness; absence of respiration, or, if present, very light and may not be observable; very weak pulse; and burns at point of contact. Always rescue a sufferer as quickly as possible, being careful not to get in contact with the live wire. Lose no time in looking for a switch for turning off the current; if there is one near at hand open at once. If there is a drill, mine auger, or any piece of wire at hand throw it across the trolley wire and rail at once. By so doing the circuit breaker in the power house will be thrown out and the current cut off. Such action may cause injury to the other working parts of the mine, but when a human life is at stake all the wires should be cut if necessary. Life should come first and the mine afterwards. If no wire or drill long enough to reach from the wire to the rail is at hand, you may proceed to remove the victim from the current, but

first get a dry board, piece of wood, or paper and put it under your feet, and protect the hand you use with your cap, coat or any dry non-conducting material, so as not to make a circuit. If possible use one hand only, placing the other behind you. If you do use both hands to remove the man from the ground, make sure that both your hands and your feet are well insulated so that you will not be caught in the same contact as your patient.

Another way is to take your belt or handkerchief or a piece of rope and loop it over the patient's feet if he is lying on the wire, and thus pull him off. If an ax is near at hand use it to cut the wire, but first make sure that the handle is dry or wrap it with a coat or cloth.

Gas Asphyxiation

In gas asphyxiation you can give no better treatment than by getting the patient into fresh air and applying the Schaefer method of artificial respiration. Always remember to make sure that the person's mouth is free from foreign substances and that his tongue is where it belongs. And of course you will send for a doctor.

SUMMARY

Drowning

As soon as you get the patient out of water, remove from his mouth any foreign matter and *pull his tongue forward.* Next lift him by the hips and

hold him so till all the water has run from his throat and lungs. Send for a doctor. Then lay him face downward with a coat under his chest so that his nose and mouth are free to the air. Start artificial respiration *at once*. While you work have someone loosen or remove clothing at neck, waist and chest, and rub the limbs toward the heart. As soon as the patient revives give a stimulant, and keep him warm and quiet.

Electric Shock

Remove patient from wires with non-conductors. Send for a doctor. Apply artificial respiration. Stimulate when conscious.

Gas Asphyxiation

Remove patient to fresh air. Send for a doctor. Apply artificial respiration. Stimulate when conscious.

CHAPTER XIII

MINOR EMERGENCIES

1 SMALL WOUNDS

WHEN you think of a scratch or a small cut, think of an antiseptic and a clean dry dressing. For an antiseptic choose tincture of iodine or 70 per cent grain alcohol. For a dressing use sterile gauze if you have it; or a pad of several thicknesses of clean cotton cloth an inch larger than the wound all round and held on with bandage or narrow strips of adhesive tape ("surgeons' plaster"); or a ring of collodion round the edge (the so-called "cocoon"), leaving the center of the dressing unsealed.

That treatment gives the best results. Certainly it is far better than court plaster alone, or adhesive tape, or collodion, for these two reasons:

First, a break in the skin opens the way for infection; that is, opens the way through which bacteria (germs) can get into the body. Germs, we know, particularly the kinds that cause infection of a wound, are everywhere, on everything, so that

whatever we scratch or cut ourselves with probably leaves many in the wound; to kill them we must use an antiseptic (see Chapter VII). Collodion will not do, for it has only a very weak antiseptic action; adhesive tape has none at all and may easily carry germs, and court plaster, having been licked, is crowded with them.

Second, whenever flesh is injured, blood and a watery fluid called serum appear in the wound and furnish splendid soil for the growth of bacteria. Your treatment should aim, therefore, to keep the wound as dry as possible; that is, the dressing should be of gauze or cloth sterilized or dipped in alcohol before applying and should be changed as often as necessary. Court plaster, adhesive plaster and collodion all seal the wound, keep these fluids in and so give infection, if present, a fine chance to develop.

An antiseptic and a clean absorbent dressing, then, make the best treatment for small wounds.

2 PUNCTURED WOUNDS

By this we mean small, deep wounds, such as those made by a nail. It is not the rust on the nail that we fear, for iron is often given as medicine: in fact,

> Nails and bolts when in solution
> Make an iron constitution.

It is the bacteria which are carried into the wound on the dirty nail that make the trouble, particularly the germ of lockjaw. This bacterium lives in all soils, but especially in those of a sandy nature, and, strange to tell, cannot grow in the open air. It must have a dark corner, where there is no oxygen. The bottom of a punctured wound is an agreeable place for a lockjaw germ to lodge, for the opening of the wound soon becomes plugged with clotted blood and serum, keeping out the air with its oxygen.

It is the same with a bullet wound. Even if no vital part is hit the danger of infection remains. Lockjaw, or tetanus, as it is properly called, frequently follows Fourth of July accidents also, not because the bacterium has anything particular to do with firearms, but because these accidents are likely to blow small pieces of wadding or powder deep into the flesh, making punctured wounds. These small foreign bodies carry with them into the flesh any bacteria that may be lodged on the skin; if the germ of tetanus is there, it is pushed into a place ideal for its growth. It is easy to understand, then, that any punctured wound should be seen at once by a doctor and thoroughly cleaned. He will probably inject tetanus antitoxin, also, to prevent the development of lockjaw.

In the case of a punctured wound from a nail or

a bullet your treatment is to make the wound bleed freely by squeezing at its sides, taking care not to touch it; then to cover it with a sterile compress. If you have iodine or alcohol at hand, pull the wound widely apart and pour the antiseptic in freely before applying the compress.

Because oxygen in the wound will tend to keep the tetanus bacteria from growing, peroxide of hydrogen is useful as an antiseptic in this one class of wounds.

When the wound is caused by a powder explosion, cover it with a sterile dressing and go to a doctor at once.

3 SPLINTERS

Splinters frequently go deep into the flesh and almost always carry infection with them. Serious trouble is likely to follow if the splinter is not removed.

Cover a needle with alcohol in a saucer for five minutes or heat it red hot with a match (the soot will not bother you). With this open up the path of the splinter by picking the skin away; if the invader lies near the surface begin to pick it out at the end that went in first, in order not to push it farther in. When the splinter's trench is uncovered, lift or pull it out and sterilize the wound with an antiseptic (see Chapter VII).

4 BOILS

Boils are small infections that begin on the surface of the skin and work down along a hair or a sweat gland. Our friend Staphy (see Chapter VII) is the burglar who thus jimmies his way into our house. After a boil is well started there is no home remedy to stop it. Poultices are bad, because they soften the surrounding skin and tend to spread the infection. Your chief object should be to prevent the formation of new boils. Be very careful not to let anything that has touched the boil touch any other part of your skin—whether it be your finger or part of your clothes or the dressing.

As soon as you find a boil developing wipe the surrounding skin thoroughly with 70 per cent alcohol, beginning with a wide circle round the boil and coming slowly in circles to the center, where the infection is. Wipe the boil itself last, throw the cloth away, and from that time on, till the boil has finished discharging, keep it covered with a light dressing changed every day or twice a day. In that way you have a good chance of stopping the spread of the boils.

Occasionally a common needle dipped in strong carbolic acid and pushed for a quarter of an inch into the middle of a beginning boil will nip it in the bud.

5 BLISTERS

Blisters are the result of continued irritation of the skin. Shoes cause them both when tight enough to "bind" and when loose enough to "shuck."

On the hike, take pains to wash your feet at least once a day; use warm water and soap, rinse and wipe *thoroughly* dry. Heavy woolen socks are best to tramp in; take with you one or two extra pairs and give your feet clean socks to work in. If, even then, you see blisters coming, try soaping the inside of your socks.

When the blister has developed treat it by emptying it of its fluid (see figure on page 87) and by protecting it from further friction by a bandage. Keep it from infection; an infected blister is a poor possession.

6 CONSTIPATION

When the bowels fail to work regularly every day harmful substances are retained in the body and absorbed. The result is a tired, uneasy feeling, often a headache, perhaps nausea and vomiting, and sometimes severe pains in the abdomen.

Avoid medicine as long as possible. Be regular. Select a time to which you can stick every day; and then *stick to it.* Plenty of water is needed; eight

to ten glasses a day, including all liquids, is not too much.

Select your diet carefully. Avoid too much meat, butter, fried food, pickles and highly seasoned food, coffee, tea and candy. Eat the green vegetables (lettuce, spinach—"greens" of any kind—watercress, celery, cucumbers, melons), rye, graham, brown or whole wheat bread, stewed prunes and the acid fruits, such as oranges, lemons, grapefruit, peaches, pears and grapes.

If medicine becomes necessary, choose Epsom salts (two to four level teaspoonfuls in a full glass of water) for a quick purge. Fluid extract of cascara (one teaspoonful; or ¼ teaspoonful every hour for four hours) has a slower, gentler effect.

7 DIARRHEA

Diarrhea may be caused by two classes of conditions.

In the first instance it is due to some irritating food or medicine you have taken. It may be slight —merely a few extra movements for a day or two, without any general ill feeling; or it may be severe and go with headache, nausea, vomiting, more or less prostration and crampy pain in the abdomen. This type of diarrhea is oftenest the result of eating spoiled food or food that contains harmful substances. (See Chapter IX, page 98.) Here it

is plain that there is something in the intestines that is irritating; the body is trying to rid itself of the poison by vomiting and by diarrhea. You must help. A dose of salts is the quickest acting purge; it should be given at once and repeated in three hours if necessary. That will increase the diarrhea, of course, but in this case that is what you want.

On the other hand, diarrhea may be part of a real disease, such as dysentery, typhoid fever or the first stages of measles, scarlet fever or diphtheria. Here it either lasts for several days, with fever and a general ill feeling, or else is followed quickly (usually one day) by a rash on the body, sore throat and so forth. The onset is rather slow; and you feel as if the trouble were spread throughout your whole body.

In this case the treatment is not to make the bowels move still oftener, but to get a doctor quickly to find out what the real cause of the diarrhea is.

Here it is natural to speak of

8 STOMACHACHE

If the pain is near the edge of the ribs in the midline and does not go below the navel, it is probably due to indigestion, especially if you have eaten a great deal or have eaten something hard to digest,

like peanuts, bananas or green apples. First try a hot drink, such as hot peppermint water or half a cup of hot water containing a teaspoonful of baking soda. A hot water bag laid on the stomach will help.

If none of these things relieve the pain, cause vomiting as described in Chapter IX and follow it with a dose of salts.

If the pain is below the navel, vomiting will do little good, for the trouble is not in the stomach, but in the intestines. Use a hot water bag. A good movement of the bowels will probably give relief. If the pain continues for several hours, get a doctor; remember that there is a chance of appendicitis and that discretion is the better part of valor.

9 HEADACHE

Constipation and eye strain are the commonest of many causes of headache. Rest, a hot bath, and an ice cap or cold cloths to the head will usually help. If the foregoing causes are removed and the headache continues for several days, be examined by a doctor.

At any rate, avoid the use of headache powders. They deaden the pain, but they do not remove the cause; and they frequently have severe, even serious, after-effects.

10 TOOTHACHE

The poet must have thought of this when he wrote of an "aching void," for a cavity is usually found in the offending tooth. Clean this gently with a swab of absorbent cotten twisted on the end of a toothpick; then roll a tiny ball of cotton, wet it with oil of cloves, squeeze it dry, and plug the cavity with it. If you have a dentist examine your teeth twice a year and fill all of the tiny cavities as they appear, you will have little trouble with toothache.

11 EARACHE

Put two or three drops of warm sweet oil in the ear. Or put the glass part of a medicine dropper on the tube of a fountain syringe; fill the bag with water at about 100° Fahrenheit, and hang it so that the bottom of the bag will be level with the ear. Direct the stream of water into the ear but be careful not to put the glass tip into the canal.

Never put anything hard into the ear, such as a toothpick, hairpin or "ear spoon."

Often a hot water bottle is enough to stop the ache. Sometimes a small piece of cotton wet with grain alcohol and placed on the water bottle where the ear will lie over it will help.

If the earache remains after you have tried these

things, see a doctor at once. Many earaches are due to infections of the middle ear, which lies deep in, behind the drum, and is close to the brain. Trouble here that is not looked after may have such serious consequences as mastoiditis, brain abscess and meningitis. Only a doctor, who can squint into your ear with his shiny instruments, can tell you whether the trouble is due to wax or to something more serious.

12 NOSEBLEED

A nosebleed is like a lazy boy on a hike; it will probably stop in a few minutes if left alone. If it does not, try the old standbys: a roll of paper held tightly under the upper lip—a key or anything cold to the back of the neck; snuffing very cold water up the nose. Avoid blowing or picking the nose. Sit or lie down and keep quiet.

The two "bleeding points" are on either side of the middle partition of the nose about as far in as the little finger will reach. Sometimes you can stop the hemorrhage (remember that any bleeding is a hemorrhage) in this way: cover your little finger with a clean cloth; put it into the nostril as far as it will go and press gently and steadily against the septum (the partition in the middle of the nose); apply the pressure for five to ten minutes; withdraw the finger very slowly and gently

in order not to remove any clots that may have formed.

13 FOREIGN BODY IN EYE

In your own eye:

Do not rub your eye. Blow your nose hard several times. Lift the upper lid away from the eyeball, pull it down and let go. If these methods fail, get help.

Eversion of the upper eye lid

Holding the upper lid

In the other fellow's eye:

In examining an eye, make all your movements *slowly*. If you move quickly near the eye, your patient will blink and squirm.

Place your thumb on the lower lid and pull it down until you can see the whole inner side of it.

To see the under side of the upper lid is somewhat more difficult, because in the lower part of the upper lid there is a layer of stiff tissue (the tarsus) which helps the lid to lie flat against the eyeball. This layer extends from the lower edge of the lid upward about a quarter of an inch; its upper edge

is often marked by a slight wrinkle in the lid. Because of this layer the lid cannot be rolled but must be turned up; also, when properly turned up it stays there by itself until the patient winks hard or until you push it down again.

To turn the lid up it is only necessary to place a toothpick, a thin match, or the point (blunt) of a pencil along the upper edge of the stiffening layer, about where the wrinkle is in the lid, and press gently in and down while with the other hand you grasp the eyelashes and pull them outward and upward. Meanwhile have the patient look down and keep his eyes open. Hold the lid in its new position with your finger on its edge and slide the toothpick out. The whole movement should be painless.

You may stand in front of the patient while you are doing this, but the better way is to have him sit down and stand behind him with his head resting firmly against your abdomen.

Now when your patient turns his eye down you can see the whole upper part of the ball as well as the upper lid.

When you have located the foreign body, try to remove it by touching it with a bit of clean cloth twisted into a point and softened with water—not with saliva. Sometimes the bit of foreign matter will stick to the eyeball. If it is embedded and refuses to be wiped away, see a doctor at once.

14 SPRAINS

A sprain is an injury to the ligament and tendons round a joint. It is usually not a serious thing, although in a really bad sprain the ligaments may be so torn that the action of the joint is always thereafter imperfect.

Considerable swelling and pain always follow a sprain. The treatment is a hot soak with massage, or hot or cold cloths laid over the joint, changing them as often as necessary to keep the temperature right. Sometimes alternate heat and cold are advised. Repeat this treatment three times a day, twenty to thirty minutes each time.

Since there is an injury to the joint, it is foolish to think that using it will help to make it well. On the contrary, rest is needed. If it is a wrist, elbow or shoulder, keep the arm in a sling; a light splint on the wrist is comfortable. If it is the ankle and you are at home, use a hot soak and the figure of eight bandage (see figure on page 110). If you are in camp, the cold brook will do nearly as well as the hot soak. If you are alone in the woods and must hobble some distance, do not take your shoe off, for the ankle and foot are likely to swell so much and so quickly that you will not be able to put it on again. Cut a stick for a cane, spare the injured foot all you can, and put off treatment till later.

15 STRAINS

Sometimes, as when you suddenly lift a heavy weight, a muscle is stretched so hard that some of its tiny fibers are actually pulled apart. This is a strain. Treatment is rest, rubbing and hot applications.

16 MUSCLE CRAMP

This occurs in muscles that have been used so long or so hard that they are tired out. They contract, by themselves, into hard knots, and are extremely painful. Cramp is commonest in the legs. The treatment is rest and massage.

Muscle cramp is very different from the crampy pains in the abdomen that occur in indigestion, constipation, diarrhea and so forth.

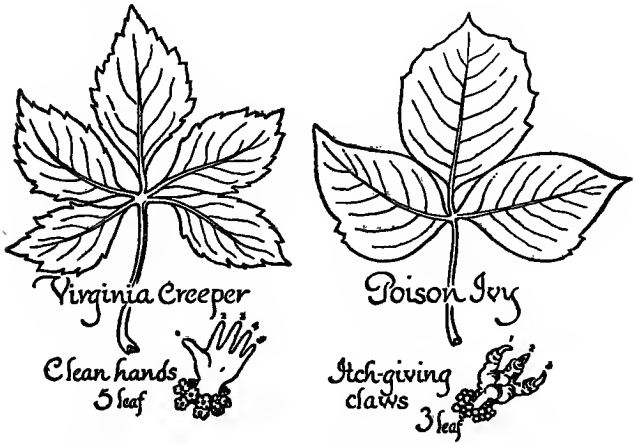
17 HICCOUGH

Take a drink of cold water, holding it in your mouth for a minute or two before swallowing it. Or hold your breath as long as you can. While you hold it press with both hands in and up under your ribs.

18 POISON IVY

Poison ivy *(Rhus toxicodendron)* is a climbing vine or small shrub commonly seen along roadsides.

Its leaves are shiny and in groups of three, a characteristic that distinguishes it from woodbine or Virginia creeper, the leaves of which are grouped in fives.



The irritating substance in poison ivy is a heavy oil that evaporates very slowly and may easily be spread by fingers or clothes. So long as it is in contact with the skin it causes itching, redness and an eruption; the condition cannot be cured until the oil is removed. To do this scrub the irritated place when it *first* itches with strong soapsuds and a small cloth, beginning in a wide circle and scrubbing slowly in toward the center. That is to avoid spreading the oil. Rinse with warm water in the

same way and dry the skin. Repeat the same process several times with grain alcohol, for this will dissolve what oil is left.

Now you are safe in believing that you have removed the cause. The next step is to soothe the skin, using vaseline, plain or carbolized; cocoa butter, cold cream, and so forth; but best of all is the so-called "white" wash, which any druggist will make up for you. This is:

Carbolic acid.....	½ dram
Zinc oxide	½ ounce
Lime water.....	4 ounces

Shake well and sop it on with cotton or a small sponge. It soon dries, leaving a coating of white powder. Do this three or four times in succession and repeat every hour. If the skin becomes too dry, apply some simple ointment, such as those above.

Other plants—nettle, rue, poison sumac or dogwood, and especially the common primrose—may cause much the same trouble as poison ivy. The treatment is the same.

19 INSECT BITES

A few drops of ammonia (the aromatic spirits will do) will relieve the sting. "White" wash (see under Poison Ivy) is excellent.

20 BROWN TAIL RASH

This occurs mostly in the Eastern States and is commonest in May and June, when the brown tail caterpillar is active. Its hairs, as well as those from the moth and from the cocoon, are barbed and carry an irritating substance; they actually stick in the flesh like tiny poisoned arrows.

Apply "white" wash (see under Poison Ivy) or carbolized vaseline.

21 SUNBURN

Sunburn is spoken of in Chapter VIII. For the burning of a mild case use "white" wash (see under Poison Ivy) and an ointment.

22 FROSTBITE

Frostbite is spoken of in Chapter VIII. The white appearance and lack of feeling in nose, cheek, ears, fingers and toes indicate that they are frozen. Do not warm suddenly, but rub vigorously in turn with ice or snow, cold water and warmer water until the part is red and tingling again.

23 CHAPPED HANDS

Chap is not always easy to prevent or to cure. Wear warm gloves in cold weather; if wool irri-

tates the skin, wear a fur-lined glove. Keep the hands out of water as much as possible and dry them *thoroughly* after washing. Keep the skin soft by frequent applications of oily or greasy substances, such as cold cream, vaseline, lanolin, liquid petrolatum, olive or almond oil and so forth.

24 CHILL FROM EXPOSURE

Occasionally, after being out in severe cold weather and getting thoroughly "chilled through," a person will have a sudden severe chill, a high temperature, headache, nausea with vomiting, and diarrhea. Rest, warm blankets and hot drinks (hot black coffee) is the treatment.

25 PANICS

Don't be one of the crowd. Keep your head and let others see how cool you are. If you are in a building, try to keep the performance or the orchestra going. Do anything you can think of to catch the crowd's attention for a minute, such, for instance, as singing.

26 "MAD" DOG

A "mad" dog is a sick dog driven wild with the torture of his disease. He is not running round

looking for someone to bite, but is trying to find relief from his pain and will bite any man or animal that gets in his way.

When you see a dog running aimlessly about, perhaps snarling and snapping and possibly with saliva dripping from his mouth, get others out of his way and then get out yourself. At least, try not to attract his attention.

Beyond that the aim is to capture him unharmed, or, if that is impossible, to kill him. Notify the police. If you are cornered and have no weapon, wrap your coat thickly about your arm and hold it out for the dog to bite at. Then catch him by the throat, throw him, and hold him down till help comes, or until you can stun or kill him.

Often a so-called "mad" dog proves not to have hydrophobia at all; in order to find this out, he must be watched by a veterinary. If he has the disease he may be killed later. In any case of doubt, especially if anyone has been bitten, make sure that the dog's head and spine are sent to the city or state Board of Health. If he was "mad" the microscope will show it and the people bitten by him may start on their two weeks of Pasteur treatment at once.

27 BITES OF ANIMALS

Bites inflicted by dogs that are not "mad," and by cats, rats, mice, snakes that are not poisonous

or by any other small animal, are dangerous in just the same way as are scratches and cuts. The treatment is the same. Sterilize the wound with tincture of iodine or alcohol and be sure that the antiseptic gets to the bottom of the wound. Cover with a light dressing to keep out further infection.

28 BITES OF POISONOUS SNAKES

The fangs of poisonous snakes are hollow, like a doctor's hypodermic needle. Through these, when the snake bites, the poison is injected into the flesh. If nothing is done it finds its way quickly into the capillaries and small veins and so is spread round the body in the blood.

To prevent this, tie a tight tourniquet round the limb just above the wound—that is, between the wound and the heart. Then, if you have no sore places in your mouth, suck the wound to get out as much of the poison as you can. It is a strange thing that this violent poison is not harmful when swallowed; still, let safety first be your motto and spit out your saliva for some few minutes afterward. As you suck, pull the tiny wound open with your thumbs by dragging on the nearby flesh.

The ordinary antiseptics are little match for the powerful poison. Some authorities recommend that a tiny crystal of permanganate of potassium be

pushed into the wound—or wounds, for there are usually two fangs.

Watch your patient for symptoms of poisoning. Stimulate him if necessary with aromatic spirits of ammonia or with hot black coffee. *Do not give alcohol in any form.* Far more persons are killed by a combination of snake and whiskey than by snake alone.

Remember that a tourniquet cannot be left on indefinitely. At the end of an hour loosen it for a few seconds and apply it again. If, in the next half hour, the patient shows no ill effects, loosen it again, and so on, till you think the danger has passed. But if enough poison escapes into the circulation during those few seconds to harm the patient, do not loosen the tourniquet again; run the chance of losing the limb by gangrene rather than the life by poison.

Reach a doctor in record time; he has means of fighting the poison which cannot be talked about in a first aid book.

29 STYES

Styes are really small boils in the eyelids. They may occur alone or in crops. Sometimes cold compresses (pieces of cloth continually dipped in ice water and laid on the eye) will keep a stye from developing when the lid first begins to be sore.

Boric acid ointment on the edge of the lid may help. Irrigate the eye with boric acid solution two or three times a day.

(Boric acid solution is an excellent eye wash for general purposes and is prepared in this way: get an ounce of the boric acid crystals—not the powder—put so many of them into a glass part full of warm water that some of them remain undissolved in the bottom after you have stirred them for several minutes. Cover the glass when not in use. Use the clear fluid for the wash.)

Eye strain, constipation or run-down condition may be responsible for these uncomfortable styes. If you have many, better see a doctor.

FIRST AID KITS FOR EIGHT BOYS

For a one-day hike:

One Red Cross First Aid Outfit for each boy.

For a one-to-three-day hike:

One Red Cross First Aid Outfit for each boy.
Several two-inch sterile gauze bandages (four are enough).
Two triangular bandages.
One bottle of 7½ grain bichloride of mercury tablets.
One ounce of tincture of iodine.
One ounce of aromatic spirits of ammonia.
One tube of carbolized vaseline.
One ½-inch rubber tube, four feet long, for tourniquet.
One yard of 1-inch adhesive plaster.
One package of picric acid gauze.
Six safety pins.

For a one-week camp:

The above, plus
Four ounces of Epsom salts.
Two dozen compound cascara tablets.

Scissors.

Forceps (tweezers).

Double quantity of iodine, ammonia, adhesive plaster and pins.

If in a snake country, half an ounce of crystals of potassium permanganate.

In the summer add a pint of 70 per cent grain alcohol and a pint of "white" wash, which consists of

Carbolic acid.... 1 dram or teaspoonful
Powdered zinc oxide ..... 1 ounce
Lime water, to make up..... 1 pint

See Chapter XIII for directions for use in ivy poisoning, insect bites, sunburn.

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